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Political Innovation

CORPORATIONS, CONTROVERSY AND GENETICALLY MODIFIED FOODS.

~~corporate engagements in controversy over genetically modified foods~~

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Abstract

Public controversy over genetically modified (GM) foods illustrates the increasing complexity of the governance of technological innovation. In the light of public displays of ambivalence towards biotechnology, corporations are paying greater attention to societal concerns over the innovation of new technologies. This thesis asks how those corporations involved in the development and commercialisation of GM foods have understood and responded to recent public controversy over biotechnology in Europe and North America.

Using approaches drawn from geography and science and technology studies, this thesis is concerned with concepts of citizenship and also with corporate identities in the context of technological controversy. This thesis focuses particularly on the ways that corporations have understood the emergence of citizen-like demands to participate in the governance of corporate innovation. The research for this thesis adopts an ethnographic approach to studying corporate engagements in public controversy. It uses the analysis of corporate texts, interviews and participation in meetings at which corporate presentations were made about GM foods. The empirical material for this thesis refers to three corporations: DuPont, Monsanto, Unilever; and two agricultural biotechnology public relations groups: the Council for Biotechnology Information in the USA, and the Agricultural Biotechnology Council in the UK.

This thesis argues that corporations have innovated new institutional forms of engagement with the public over biotechnology. These engagements have configured the 'socially responsible corporation' and the 'consumer-citizen' as actors in more democratic forms of corporate innovation. This thesis concludes that these new forms of governance are partial, fragile and contested, but that they offer potential avenues for further public debate about the governance of corporate innovation.

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Chapter 1

Public Controversy over GM Foods: corporations, innovation, and the public

1.1 Introduction: corporate presentations in the face of a global crisis

On a bright, warm evening in late April 2001 people began to arrive at Harvard's Faculty Club. They followed signs to the club's dark, wood-panelled library where they collected a conference pack and a drink. About 50 academics, government regulators and people working in NGOs and multinational corporations had travelled from Europe, India and the across the USA. What had drawn them to Cambridge, Massachusetts was a two day conference on "Biotechnology and Global Governance: Crisis and Opportunity". The meeting was organised by Sheila Jasanoff, a professor of science and technology studies. In her introduction, she made explicit the goal of bringing different perspectives together to explore the possibility of developing a shared understanding of the conditions of global governance of agricultural biotechnology.

The conference began with a session on "Accountability in Research". The first speaker was Helga Nowotny, a professor of the social studies of science at the Swiss Federal Institute of Technology (ETH). She spoke with the authority of someone at the centre of debates about science policy in Europe.[1] This was a time of increasing divergence between US and EU approaches to the governance of science and technology. Less than a month earlier a recently inaugurated President Bush had withdrawn US support from the Kyoto Protocol on climate change, provoking blunt criticism from many European governments. Nowotny addressed the conference on the relations between a changing, globalising society on the one hand, and

[1] See for example two important books on science policy co-authored by Nowotny: Gibbons *et al.* (1994) and Nowotny *et al.* (2001).

transformations of scientific knowledge production on the other. She argued that established approaches to 'reliable knowledge' were giving way to forms of 'socially robust knowledge'. In other words, there was less faith being placed in disciplinary peer-review, less distinction drawn between basic and applied research, and a greater emphasis on new spaces of knowledge production, such as NGOs, management consultancies and think-tanks. These spaces of negotiation between science and society would provide, according to Nowotny, a new basis for the construction of credible, socially robust knowledge.

The next person to speak was Robert Horsch of Monsanto. He is one of the company's Vice Presidents and a member of its "Pledge Leadership Team", which has responsibility for reinventing the way that Monsanto engages with public debates about biotechnology. The title of his presentation was "Transparency in Corporate Research". He began by directly addressing Helga Nowotny:

> You speak a different language. I suppose that I come from a 'reliable knowledge' school of science, but one thing we have learned during the past three years is that the reliable knowledge model is not sufficient any more.
>
> I've no idea what socially robust knowledge means in practice, or how we as a company can earn the consent of society. But rather than defend the status quo I have come here to this conference because we need some help. We need to learn to evolve, while not shooting ourselves in the foot commercially. The discussions here over the next two days are not just about esoteric concerns for Universities, for us they are a political reality in society.
>
> (Horsch, 27 April 2001, from my field notes)

Horsch went on to say that Monsanto's CEO had launched the company down a path of engaging with society's concerns over corporate accountability and biotechnology a couple of years earlier. He said that he and his colleagues at Monsanto had received professional training in how to listen. Although he did not make clear what he meant by listening, he did say that: "We are still at the stage of asking who to talk to and what language we should use."

Horsch then moved from talking about the dialogue that Monsanto was engaging in to describe the company's commitment to 'transparency'. This, he said, was being delivered through its website, Monsanto.com. Horsch again referred to Nowotny's

typology of knowledge when he said that Monsanto was operating with what he called an 'old model' of transparency underpinned by 'reliable knowledge'. He said that Monsanto was becoming more transparent by increasing collaborations with academic scientists at earlier stages of research projects, and undertaking more studies on the safety of biotechnology. The company was also increasing the number of peer-reviewed articles published by its scientists.

Horsch had come to this conference on the crisis facing the governance of biotechnology as a representative of the company that accounted for a large majority of the world market for GM crops. Yet, he said that he was there to 'listen'. All that the other people at the conference learned was that Monsanto was trying to listen harder and become more transparent. This struck me at the time as an intriguing representation of Monsanto to that particular conference.

Horsch had said that Monsanto was now "both continuing with the old path and starting to learn new rules". When the time came for questions, the sociologist of risk Ulrich Beck asked why Monsanto was continuing with its old model of 'reliable science' if they thought it was causing them so many problems. Horsch answered that Beck had a good point, and that was why he had come to the conference. He said that it was his job to "translate" the messages he was hearing at conferences for the rest of the company when he returned to St. Louis.

These exchanges, taking place as they did at the Harvard conference on "Biotechnology and Global Governance", illustrate the themes of my PhD thesis. How were people from a company like Monsanto understanding and addressing public debates about the governance of agricultural biotechnology? How was the company 'Monsanto' being presented through exchanges like that between Horsch and Beck? How should the venue of conferences like that held at the Harvard Faculty Club be understood as part of the process in which corporations, NGOs, governments and academic social scientists were constructing questions about the governance of biotechnology as both 'global' and undergoing a 'crisis'? What role was being played by social science in articulating new models of knowledge production? And by what processes were 'the public' and 'society' becoming visible and vocal actors in the context of corporate research strategies?

This PhD thesis is concerned with new institutional forms developed by multinational corporations to cope with the challenges they faced in confronting a global crisis in the governance of agricultural biotechnology. During 1998 and 1999 the leading agricultural biotechnology (agbiotech) companies were forced to re-evaluate their plans for the commercialisation of GM crops. Public controversy in Europe, together with resistance from farmers and consumers in many other parts of the world, including Japan and India, was constituting a global challenge to agbiotech corporate strategy. In response to this DuPont and Monsanto led the other companies in publicly reversing their approach to critics of biotechnology. The chief executives of both companies promised that they would listen and respond to societal concerns, and that they would become more transparent to public scrutiny.

Agricultural biotechnology companies have made these commitments as a strategic response to being forced by the global controversy to consider 'the public' as citizens as well as consumers of their technology. In doing so, the companies have adopted languages current in contemporary social and political discourse in an effort to restore their legitimacy as innovators. They have committed themselves to promote public participation through 'dialogue' and greater corporate accountability through 'transparency'. Through the course of this thesis I am concerned with how the companies have institutionalised these rhetorics as they have 'performed' the dialogic and transparent company.

These moves by the companies can be understood as attempts to reduce uncertainty by rendering the category of 'the public' calculable in terms of corporate decision-making. The institutionalisation of dialogue and transparency can therefore be understood as attempts to reduce conflict over biotechnology by reframing the crisis of public legitimacy as a managerial problem for the multinational corporations. This thesis explores the ways that such corporate moves to reframe the public have constructed new alliances, developed new techniques and produced new spaces of negotiation. In doing so, problems that had been external to corporate technology strategy 'overflow' into the corporate framing of their relations with the public as citizens with respect to biotechnology. These overflows are creating new political spaces, new subjects and new objects for political contestation.

In order to address these themes, this thesis engages with literatures in geography and science and technology studies. Corporations are understood as performing their identity through carefully choreographed interactions with a variety of audiences. In the context of controversy over biotechnology these performances recreate boundaries between the company's 'inside' and 'outside'; and in the process, engage in the construction of new distinctions between 'private' and 'public' spheres in the governance of technology. The staging of these performances of corporate relations with 'the public' are achieved through technical arrangements which frame the interactions between the corporation and its publics. This process of framing is both discursive and material.

The corporations studied here extend their managerial modes of framing across a global scale, through attempting to form a range of heterogeneous associations. The approach that I take in this thesis calls attention to the partial and provisional production of the heterogeneous actor, 'the corporation', and its equally contingent framing of 'the public'. This thesis is concerned with the ways that these achievements intersect with stabilised discourses of political rights in the context of contemporary technological controversies. The thesis also investigates the ways in which multinational corporations are becoming entwined in discourse and practices of 'global' liberal democratic norms of citizenship rights and institutional accountability.

This thesis contributes to an understanding of the governance of technological change in three ways:

- Through substantive study of the controversy over GM foods by extending empirical attention to the corporation as an important site at which controversy is framed.
- By developing theoretical and empirical understandings of the corporation as a site for the production of knowledge, and as an actor in the construction of a contemporary technological public sphere.
- By recasting theoretical understanding of the governance of technology in terms of constitutional arrangements of citizen-like rights.

The research for this thesis focuses on corporate engagements with public controversy over GM foods in Europe and North America. Of the six corporations that are currently involved in research and commercialisation of GM crops, Monsanto and DuPont are the largest seed companies and have also led interventions in public debates about biotechnology. Unilever, the consumer goods company, is one of the world's largest foods manufacturers, and has been actively involved in debates about GM foods. I have chosen to follow Monsanto, DuPont and Unilever as they frame their responses to public controversy over GM foods. Monsanto and DuPont have also united with the other four agbiotech corporations (Bayer, BASF, Dow and Syngenta) to form public relations groups in Europe and North America. I have studied the ways that the US-based group, Council for Biotechnology Information, and the UK-based Agricultural Biotechnology Council, are operated by public relations agencies whose techniques are performing a particular version of the 'agbiotech industry'. I use empirical exploration of these two bodies to develop understandings of the practice of public relations in the context of technological controversy.[2]

In the following sections of this chapter I introduce a chronology of some of the main events that have marked modern biotechnology as controversial. Starting with the first experiments demonstrating the use of recombinant DNA technology in the early 1970s this section traces moments of controversy in the development of agricultural applications of modern biotechnology. Section 1.3 then explores social science research into public attitudes to agricultural biotechnology and the ways that representations of public attitudes have contributed to the construction of the global controversy over biotechnology, which forms the backdrop to this thesis. Section 1.4 discusses the strategies of the major companies involved in the commercialisation of GM crops. This section also begins to sketch the responses of the agbiotech companies to public controversy. Section 1.5 then discusses approaches to understanding the governance of biotechnology, and explains where this thesis fits within such approaches. Finally, I introduce the overall structure of this thesis.

[2] See Appendix B for a profile of DuPont, Monsanto, Unilever and the two public relations bodies.

1.2 Contours of the global GM controversy

By 1974 modern biotechnology was taking shape. During the first few years of the 1970s scientists working in the fields of biochemistry, microbiology and the new area of molecular biology developed the techniques that allowed defined strands of DNA to be inserted into living cells. Known as recombinant DNA technology, this ability to manipulate living organisms at the genetic level is the basis of what is termed 'modern biotechnology' or 'genetic engineering' or 'genetic modification'.[3] Scientists had been looking forward to this achievement throughout the 1960s, and even before its demonstration in the laboratory the technology had already brought together concerns and excitements about its scientific promise, commercial potential and possible risks (Kay, 2000; Wright, 1994).

This section briefly describes some of the key events in the regulation and commercialisation of GM crops. It does so with particular reference to public controversy in the UK and USA. First, it discusses the regulatory systems which were established for the regulation of biotechnology research and agricultural biotechnology in the USA and EU. Secondly, it charts the growth in sales of GM seeds since the first large-scale commercialisation in 1996. Thirdly, it describes the most significant events around which the public controversy took shape in the UK and USA. Finally it discusses the ways in which the global South has figured in controversy over GM foods in Europe and the USA. A brief chronology of events mentioned in this section and subsequent sections is shown in Figure 1.1.

[3] Throughout this thesis I use these terms interchangeably. When I use the term 'biotechnology' I am following common practice in using it to refer to the body of techniques stemming from recombinant DNA technology.

Feb 1975	Asilomar Conference *proposes self-regulation of the scientific community through risk assessment and 'biological containment'*
1986	USA agbiotech regulatory framework established *by the US President's Office of Science and Technology Policy (OSTP). It establishes that agbiotech risks are covered by existing regulations*
1987	First release of GM organism approved by US Government, *in trials of "ice-minus" GM bacteria on strawberries, provokes controversy*
1990	EU agbiotech regulatory framework established *in the 'Deliberate Release' Directive 90/220/EEC*
1993	Concept of 'substantial equivalence' introduced *in OECD report*
1996	Widespread commercialisation of GM crops begins
June 1998	Monsanto launches pro-GM adverts in France and UK
Aug 1998	Arpad Pusztai in *World in Action* broadcast in UK *reports on adverse effects on rats from eating GM potatoes*
1998	EU *de facto* moratorium on approving GM crops begins
April 1999	Tesco and Unilever announce non-GM policy in UK
May 1999	Potential harm to monarch butterflies from GM crops in USA *Scientists publish results that suggests possible harm to the larvae from eating GM maize pollen*
Sept 1999	DuPont CEO calls on industry to listen to its critics *in speech critical of the agbiotech industry's arrogant dismissal of public critics, DuPont's CEO commits the company to engaging in 'dialogue'*
Oct 1999	Monsanto drops 'terminator' technology *that would ensure that GM crops produce infertile seeds*
Oct 1999	Monsanto CEO speaks at Greenpeace Business Conference. *Shapiro, in video link to London conference admits Monsanto made mistakes by ignoring public critics of agbiotech*
Dec 1999	Monsanto taken-over by Pharmacia & Upjohn, *new company, named Pharmacia then announces it will spin-off its agricultural interests under Monsanto name*
April 2000	Council for Biotechnology Information launched. *Joint agbiotech industry public relations body for North America launches with TV adverts in USA and Canada*
July 2000	Golden Rice on the cover of Time magazine. *GM rice engineered with higher concentrations of β-carotene to combat vitamin A deficiency*
Sept 2000	StarLink maize found in US food products *despite failure to receive regulatory approval for human consumption due to its potential to act as an allergen*
Nov 2000	"New Monsanto Pledge" announced by CEO *following the launch of the new Monsanto, its CEO commits to greater corporate transparency and to dialogue with critics of agbiotech*
Mar 2001	Percy Schmeiser loses court case to Monsanto, *ruling finds that Schmeiser owes Monsanto royalties for GM soya which he claims not to have knowingly planted*
Feb 2002	Agricultural Biotechnology Council launched. *Joint agbiotech industry public relations body launches in UK*
May 2003	USA, Canada and Argentina take EU to WTO dispute

Figure 1.1 Chronology of events in the public controversy over GM foods

Scientists respond to potential risks: The Asilomar Conference, 1975

In the early 1970s many of the most significant discoveries in molecular biology were taking place in the USA. This was due in part to the huge investments in scientific research on the part of the US Government. The National Institutes of Health budget grew roughly exponentially from 1945 to the end of the 1960s (Wright, 1994: 24). US national science policy proceeded on the assumption that the biological sciences promised great benefits to society without considering the potential risks. Some scientists working in the new field of molecular biology began to speak publicly about the possible dangers posed by advances in this area.

Much of this research was being carried out on US university campuses that had become radicalised during protests against the Vietnam War. For some, such as the young molecular biologist Jon Beckwith, science had lost its privileged separation from political debates due to its role in the service of the war. When Beckwith's group were the first to purify a bacteria gene he and his colleagues held a press conference in which they called attention to the possible dangers of their research (Beckwith, 2002). As the field progressed, concern grew within the US scientific community about how the risks could be managed. In 1974 the US National Academy of Sciences asked Paul Berg, a pioneer of recombinant DNA research, to chair a committee of leading molecular biologists and biochemists to address these concerns. The result was an open letter to the scientific community which focused on the possible hazards of engineering dangerous bacteria or viruses. The letter urged that scientists engaged in this research postpone potentially dangerous experiments until the scientific community could address these concerns.

The Berg Letter led to an international conference of scientists which addressed the problem of how to regulate biotechnology research. The Asilomar Conference took place in California in February 1975. The conference was successful in influencing policy discourse in the USA and internationally (Krimsky, 1992; Jelsma, 1995). It emphasised the importance of self-regulation by scientists, and it focused concern on safety hazards, rather than broader social concerns. The dominant interpretation of the Asilomar conference has been that the public was alerted to the possible risks of recombinant DNA experiments by responsible scientists, who then self-imposed a

moratorium on their work until they developed appropriate safeguards to protect public health (Wright, 1994: 136-59).

When biotechnology experiments left the laboratory the potential risks began to catch the public imagination. In 1987 the first deliberate release of a genetically modified organism with the approval of the US Government took place. In University of California experimental fields, crops of strawberries were sprayed with the 'ice-minus' bacterium, genetically engineered to decrease frost damage. Local residents protested against the release of the genetically modified organisms into the environment, and images of researchers wearing protective white 'space-suits' as they sprayed the strawberry fields were lodged in the public imagination (Krimsky, 1992; Jasanoff, 1995a). Over a decade later 'crop trashers' around the world wore the white protective suits to indicate the laboratory origins of GM crops.

The principle of self-regulation of the scientific community that had been established at the Asilomar Conference in 1975 was based on the containment of any potentially hazardous GM organisms. However, as demonstrated by the protests over the 'ice-minus' bacterium trials, once these new organisms began to leave the laboratory, public questions were raised about possible risks. In order for GM agriculture to be developed a new system of regulation was needed.

Regulating GM foods: the principles of 'substantial equivalence' and 'precaution'

The GM crops currently grown on a commercial basis are soya, maize, cotton and oilseed rape. These crops are globally traded commodity crops; therefore the regulation of GM agriculture has become a significant issue in the politics of world trade. The USA and EU, the world's largest food producers and food markets, have developed quite different positions towards the regulation of GM crops. This difference has produced a contentious geography of regulatory conflicts.

The US model of regulating agricultural biotechnology was established in 1986 in a report by the President's Office of Science and Technology Policy (OSTP, 1986). The US approach did not establish any new legislative framework for regulating

agricultural biotechnology. The existing agencies, the Environmental Protection Agency, the Food and Drug Administration and the Department of Agriculture remained responsible. The US approach relies on information provided by the agbiotech companies to demonstrate that GM products are substantially equivalent to conventional products.

The US has established an approach to regulating GM foods which focuses on the products developed by the technology; this contrasts to debates in Europe which have been concerned with the novel process of genetic modification itself (Jasanoff, 1995a). The European regulatory framework for GM crops and foods was established by the 1990 'Deliberate Release' Directive (90/220/EEC) and the 1997 'Novel Foods Regulation' (258/97). These regulations set up a complex process in which the regulatory authorities of each member state have the opportunity to comment. If there are questions raised during this process, a European committee of scientists then has the opportunity to comment on the application before a decision is taken by the member states using the qualified majority voting system. However this system ground to a halt during 1998 amid growing farmer and consumer activism against GM foods. A group of countries initiated a *de facto* moratorium of approvals which, at the time of writing, is still in place (Levidow, 2001).

In the context of public controversy in Europe over GM foods, the EU attempted to establish a regulatory system that would adopt a more precautionary approach. In 2001 a new directive on deliberate releases was adopted in an attempt to overcome objections to the European regulatory system. This new directive, 2001/18/EC, adopts a more precautionary approach and includes a requirement for post-market monitoring. However, the moratorium remains in place while outstanding concerns are addressed. Principal among these issues are the establishment of a traceability regime, labelling, and a system of liability in case of the contamination of non-GM crops.

The US and EU have developed different approaches to the regulation of GM agriculture. The US model is based on the assumption that biotechnology does not, of itself, pose any new risks. This approach suggests that existing regulatory institutions are able to manage GM foods by operating the principle of 'substantial equivalence',

which was first formalised in an OECD report published in 1993 (OECD, 1993). This stated that if the GM food is chemically equivalent to its non-GM counterpart then it can be treated in the same way. The alternative approach asserts that GM technology may pose new risks, which require new regulatory instruments. This approach invokes the precautionary principle, which states that the novel processes of GM agriculture pose risks that require extra monitoring and testing even though specific dangers have not yet been demonstrated.

The international trade in GM crops and food is covered by the Cartagena Protocol on Biosafety to the Convention on Biological Diversity. This treaty enshrines the right of informed consent of nations receiving GM products, and it refers to the precautionary principle. However, the most significant international development in the regulation of GM foods is the formal recourse to the WTO's dispute settlement process by the USA, Canada and Argentina in May 2003 (GeneWatch, 2003). These countries allege that the European moratorium is scientifically unjustifiable, and represents an illegal barrier to trade. It is in this context of unresolved differences between US and EU regulatory approaches that agbiotech companies are marketing GM crops.

The global commercialisation of GM crops since 1996

The first GM plants to get regulatory approval for cultivation and sale as food were two kinds of GM tomato, approved in the USA and Europe. In the UK, Sainsbury's and Safeway launched GM tomato puree which went on sale in February 1996. That year also saw the first commercial planting of GM soya in the USA.

The annual review of global cultivation of GM crops since 1996 continues to show that production is highly concentrated by the type of crop, the genetic trait, and the countries in which they are grown. The following data come from the US-based, industry-funded International Service for the Acquisition of Agri-Biotech Applications (ISAAA) (James, 2003).

The main GM crops that are grown are soya, maize, cotton and oilseed rape. In 2003 GM soya was the most widely grown GM crop, and accounted for 55 per cent of the

76 million hectares of soya grown globally. Of the 140 million hectares of maize, 11 per cent was GM in 2003. 21 per cent of the 34 million hectares of global cotton production was GM. Finally, GM oilseed rape, which accounted for only 5 per cent of the total agricultural production of GM crops, represents 16 per cent of the area cultivated with oilseed rape (James, 2003).

There are only two GM traits that are widely grown: herbicide tolerance and insect resistance. In 2003 herbicide tolerant GM crops made up 73 per cent of the total of cultivated GM crops, insect resistance made up 18 per cent, and crops combining herbicide tolerance and insect resistance, 8 per cent (James, 2003). The dramatic increases in the global production of GM crops since 1996 have been concentrated in five countries, which together grew 98% of the world's GM crops in 2003. The USA grew 63 per cent of the global total; Argentina 21 per cent; Canada 6 per cent; Brazil 4 per cent and China 4 per cent (James, 2003). In addition to the three dimensions of concentration covered by the ISAAA report (crop, trait, country), GM agriculture is also highly concentrated in terms of the companies providing the GM seeds, which I discuss Section 1.4.

Public controversy over GM foods

The rise in the production of GM crops since the mid 1990s has been accompanied by events that have catalysed what has become a global controversy over agricultural biotechnology. The first widely reported public protests which contributed to the current controversy were led by Greenpeace. When the first ships containing mixed cargos of GM and non-GM soya reached Europe in the autumn of 1996 the NGO took to small boats in a symbolic attempt to blockade the ports.

A turning point in the UK media coverage of GM foods came during the summer of 1998. This moment is pivotal in the formation of the current global controversy over GM foods. A scientist working at a government laboratory in Scotland, Dr Arpad Pusztai, was interviewed for a *World in Action* television programme on GM food, broadcast in August 1998. The following account comes from three journalistic books (Lambrecht, 2001; Rampton and Stauber, 2001; Rowell, 2003a). Pusztai had been

conducting experiments on the effects of feeding GM potatoes to rats at the Rowett Research Institute as part of a study funded by the Scottish Office. In interviews, Pusztai says that he and his collaborators had been surprised that at the start of their study in 1995 very few peer-reviewed papers on toxicological feeding studies of GM foods had been published. When his results began to indicate that there may be some adverse effects on the rats due to some unknown consequence of the genetic engineering process, Pusztai began to have difficulties agreeing with his collaborators on how to proceed.

Commenting on his appearance on *World in Action*, Pusztai has said: "It was 150 seconds. All I said was that we had come across a bizarre surprise finding when we ran experiments to test what happened to animals who ate genetically modified potatoes. Then the whole world caved in around me." (quoted in Rampton and Stauber, 2001: 152). Pusztai was suspended from the Rowett Insitute on the Wednesday following the Monday evening broadcast of the *World in Action* programme. His research group was disbanded and the head of the Rowett Institute, Professor James, told the media that Pusztai "unfortunately had muddled up two experiments" (quoted in Rowell, 2003a: 88). What followed has generally been referred to as a 'media furore' in the UK that continued building through to the spring of 1999. As the UK Cabinet Office has observed: "Genetically modified crops – and the issues raised by their possible cultivation and consumption have attracted considerable controversy and debate. For a short period in February 1999, these issues became front-page news." (Cabinet Office, 2003: 21).

On the day that the *World in Action* programme was broadcast there were front-page headlines such as "Genetic Crops Stunt Growth" in *The Express* (1998). And following Pusztai's dismissal, newspapers published partially-corroborated conspiracy stories which focused on the influence of Monsanto and the US Government on the pro-agbiotech policy of the British Government, giving rise to headlines such as those in Figure 1.2.

"They Couldn't be Closer to Blair. So Who are These Men Working for the World's Biggest Genetic Food Firm and Opening Doors to the Highest Level of Government?"
Eastham, P. (1999) *The Daily Mail*, 13 February 1999: 5.

"Minister Blackened My Name Says Doctor"
Leake, C. (1999) *Mail on Sunday*, 14 February 1999: 5.

"The Strange Case of the Rats, the Cover-up and a Political Hot Potato"
Arthur, C. (1999) *The Independent*, 16 February 1999: 3.

"I Have Been Crucified, says Dr. Arpad Pusztai"
Rimmer, A. (1999) *Sunday Mirror*, 21 February 1999: 7.

"How I Told the Truth and Was Sacked"
Lean, G. (1999) *The Independent*, 7 March 1999: 11

"Smear Campaign fails to Silence Scientist Who Spilled GM Beans"
Taylor, P. (1999) *Sunday Herald*, 23 May 1999: 7.

"Heartfelt Fears of the Whistleblower Who Spilled the Beans over GM"
Clover, C. and Irwin, A (1999) *The Daily Telegraph*, 10 June 1999: 4.

Figure 1.2 Sample of headlines on the Pusztai affair

A survey of media coverage of GM foods in other European countries points to the Pusztai affair in the UK as triggering an explosion in the amount of newspaper reporting on the potential risks from GM foods (Hagendijk, 2001). The story has two important elements which catalysed widespread public controversy in Europe. It undermined the claims of the regulatory authorities and the agbiotech industry that the safety of GM foods was assured by scientific evidence. The second element was the suggestion that an unaccountable US multinational corporation was applying political pressure in order to ensure the regulatory acceptance of GM crops.

One of the most dramatic reversals to the global agbiotech industries occurred when UK retailers announced in the spring of 1999 that they would no longer use GM ingredients in their products. A US environment journalist with close connections to the biotech industry has written a popular book on GM foods in which he identifies controversy in the UK as marking a turning point in the commercialisation of agbiotech:

> In the brief but stormy history of genetically modified food, late 1998 to early 1999 was the period and Britain the country where counterinsurgency rose. The effect shook the biotech industry. Between February and May of 1999, Britain's major food retailers – Sainsbury, Safeway, Tesco, Marks & Spencer, and Somerfield – declared they would remove products with genetically modified ingredients from their shelves. McDonald's and fast-food outlets followed. Industry reps returned to the United States from Britain during these months spoke as though they'd fled the German bombs of World War II.
>
> (Lambrecht, 2001: 219)

This reversal of commercial fortunes for the agbiotech industry points to a clash of geographies of GM food governance. The agbiotech corporations and national governments had focused on state (and EU) regulation as a means of protecting public interests and therefore ensuring the social acceptance of GM technology. The legitimacy of these systems for securing the successful introduction of GM foods depended on appeals to public confidence in the credibility of the scientific basis of regulation. However, in the context of low public trust in the regulatory system in the UK and the rest of the EU following the BSE crisis and other scandals, the credibility of the regulatory system was undermined. New actors entered the arena of technology regulation: NGOs, food producers, consumers, news media, food retailers, and public protestors.

Whatmore (2002) has argued that public controversy over GM foods should be understood as an expression of a 'hybrid geography' in which the vital qualities of the soybean and the visceral experiences of eating are equally important elements in the production of GM agriculture. She argues that overlooking the multiple, hybrid geographies of nature-society, and of public-private spaces, leads to the unexpected commercial reversal of the policies of governments and agbiotech industry for the commercialisation of GM foods. Following the retreat from GM ingredients announced by major UK food retailers and producers in April 1999, this hybrid geography was asserting itself as a looming trade war between the USA and EU.

Despite the continued dominance of 'substantial equivalence' regulation in the USA, and the widespread adoption of GM crops by US farmers there have also been moments of controversy in North America. Three prominent events since 1996 have contributed to a public controversy over GM foods, albeit one that has never reached

the proportions witnessed in EU countries. In May 1999 a letter to the journal *Nature* was published raising the possibility that insect resistant *Bt* maize could harm the colourful and charismatic monarch butterfly (Losey *et al.*, 1999). From that moment on, public demonstrations against GM crops in the USA almost invariably make visual reference to monarch butterflies. Further experiments suggested that the planting of *Bt* crops was unlikely to seriously damage the butterfly population (see Chapter 6), however this marked the first moment at which the environmental risks of GM crops became mainstream news in the USA (Charles, 2001: 243-248). The second major incident was the announcement by Friends of the Earth in September 2000 that they had evidence that some foods contained GM maize that had not been approved for human consumption. Starlink maize, product of the European company, Aventis, had been approved for use in animal feed; but data that suggested the possibility that it could induce an allergic reaction in some consumers led the US regulatory authorities to delay a decision on its approval for human consumption. This demonstration that a leading agbiotech company was unable to manage the distribution of its products reduced the global food industry's confidence in the agbiotech industry as a whole (Charles, 2001: 284-288).

In March 2001 a judge in Saskatoon, Canada ruled against a farmer, Percy Schmeiser, and in favour of Monsanto. The court ruled that despite Schmeiser's claims that he did not intentionally plant Monsanto's soya, he owed the company royalties on the RoundUp Ready soya that had been growing on his farm. For critics of GM crops the Schmeiser case has come to represent the power that the intellectual property regime gives the agbiotech companies at the expense of farmers. According to the journalist Daniel Charles, a Monsanto official told him that no other topic had provoked as much hate mail as the Schmeiser case (Charles, 2001: 189). While these events are cited by North American critics of current forms of agricultural biotechnology they have not resulted in a consumer revolt, which is how the agbiotech industry describes what happened in the UK and the rest of Europe during 1998 and 1999. Despite this, the three events I have sketched here have become moments in a global controversy over GM foods.

My account so far of events that have constituted the global public controversy over GM foods has focused on Europe and North America, more specifically the UK and

USA. This reflects the sites in which I have carried out research for this thesis. There are other reasons for this concentration. The six major agbiotech companies are all based either in the USA or Europe; the USA is the major producer of GM crops, and the EU is the largest food market; consequently the regulatory and commercial situations in the EU and USA, and the relations between these two powers, is crucial in defining the trajectory of GM technology. However, the global character of agricultural biotechnology and the controversy that surrounds it extends beyond Europe and North America.

The global South plays an important part in debates about GM technology. The agbiotech companies are multinational and the principal GM crops are global commodities. Countries which export agricultural products are necessarily caught up in debates about the governance of GM food. The plight of farmers is invoked on all sides of the controversy, whether as potential recipients of a technology that will be able to increase agricultural productivity, or as the dispossessed in an new era of bioimperialism (Pinstrup-Andersen and Schiøler, 2001; Shiva, 1997). The farmers and activists in the South are not, however, silent pawns in a power struggle between the US and EU. Two of the most prominent pro and anti-GM activists are from India. C. S. Prakesh is a plant scientist at Tuskegee University in Alabama, whose website, AgBioWorld, and electronic newsletter, AgBioView, are the principal public forums for pro-GM scientists to discuss issues and plan interventions in the controversy. Vandana Shiva, director of the New Delhi-based Research Foundation for Science, Technology and Ecology, is one of the most forthright and indomitable critics of GM agriculture (Shiva, 1997).

'Terminator genes' and 'Golden Rice' were two important contributory issues to the global controversy over GM foods during the period of my study. Both focused on the implications of this technology for farmers in the developing world, and both combine voices from North and South. Perhaps Monsanto's most unambiguous defeat was its announcement in October 1999 that it would not develop 'Terminator' technology. This technology was designed to ensure that the seeds of GM crops would be sterile, and thus protect the intellectual property rights of the agbiotech companies. This technique was being developed by Monsanto's partner, the cotton seed company Delta and Pine Land. The campaign against this technology was launched by the

Canadian-based agricultural development NGO, the Rural Advancement Foundation International (RAFI), and it was they who came up with the name 'Terminator'. From the spring of 1998 when Monsanto announced its intention to buy Delta and Pine Land, until Monsanto's unequivocal rejection of the technology, the Terminator campaign succeeded in rallying critics of GM agriculture across the globe (Charles, 2001; Lambrecht, 2001).

'Golden Rice' was an equally widely discussed technology. Golden Rice, named after its yellow colour, is genetically engineered to be rich in β-carotene, which is a precursor to vitamin A. Proponents of biotechnology pointed to the potential of 'Golden Rice' to alleviate the chronic problem of vitamin A deficiency in many countries in which rice is an important food. The development of 'Golden Rice' was announced in *Science* in early 2000 (Ye *et al.*, 2000), and on 31 July that year it had made the front cover of *Time* magazine, along with one of its inventors Ingo Potrykus of the Swiss Federal Institute of Technology. The main headline on the *Time* front cover read "This rice could save a million kids a year", however this figure was hotly disputed by critics from both the global North and South. By the summer of 2000 the contours of the GM controversy were already well established, as were global networks of the technology's proponents and detractors. The debates around Golden Rice reinforced these already established patterns.

This section has explored the disjunction between biotechnology regulatory systems and public controversy. Regulatory mechanisms established in both the EU and USA by the time of the first large-scale commercialisation of GM soya in 1996 failed to identify and manage the problems that GM agriculture confronted. A series of events highlighted the inability of the 'substantial equivalence' based regulatory system to reassure publics that potential risks were being identified and managed. These events were woven together into a global controversy. This controversy involves a long list of actors, including nation states, the EU, the UN, agbiotech companies, farmers, NGOs, food producers and retailers, consumers, scientists, and protestors. The controversy can be understood as expressing a hybrid geography but it has been mapped onto existing international relations leading to a potential US-EU trade war, and to disputes among and between the global North and South about the extent to

which GM crops offer opportunities for development or another turn of the neo-imperialist screw.

One of the underlying differences between the established regulatory systems and the expression of global public controversy is the difference between the roles played by active citizens. In the regulatory regime established between the state and the agbiotech companies, one of the principal goals is to achieve the social acceptance of new technologies through narrow guarantees of its safety. This offers the public a binary choice to either accept or reject the technology based on their confidence in the regulatory arrangements. The events that sparked controversy, however, demonstrated a much greater critical engagement on the part of the public. The Pusztai affair, the monarch butterflies, golden rice, terminator technology, all these events and campaigns depended on a questioning of scientific judgement and a weighing up of contradictory evidence. This citizen-like character of 'the public' as constructed through controversy over GM presented a new actor, unfamiliar to the agbiotech companies. The role played by social science in constructing representations of 'the public' in controversies over biotechnology is explored in the following section.

1.3 Social science understandings of 'the public' in controversies over GM foods

As disputes grew nationally and internationally about the appropriate regulation of GM foods, public attitudes became increasingly important to Governments, industry and campaigning NGOs as each vied for legitimacy. Social science has played an important role in this competition for legitimacy by researching and representing public attitudes to biotechnology. In doing so, social scientists have interpreted the crisis of biotechnology governance in terms of public controversy driven by public ambivalence towards GM foods. Social science has interpreted this public controversy as a global phenomenon, and social scientists concerned with interpreting public attitudes have themselves become influential actors in the global controversy. In this section I will illustrate these points with examples of social science research on the controversy over GM foods, some of which I will return to in subsequent chapters.

An explicit instance of the social scientific representation of the global controversy over GM foods is provided by an international group coordinated from the London School of Economics. *Biotechnology: the Making of a Global Controversy* (Bauer and Gaskell, 2002a) reports on research that combined three empirical approaches: public opinion surveys; analysis of government policy and regulation; and media analysis. The studies were carried out in each member state of the European Union, as well as Norway, Switzerland, Canada and the USA.[4] At the heart of their analysis is the contention that public opinion plays a crucial role in shaping the diffusion of technologies through society. This, they argue, has now been accepted by industry:

> Whereas the biotechnology industry assumed that regulatory processes were the sole hurdle prior to commercialisation, it is now apparent that a second hurdle, national and international public opinion must be taken into account.
>
> (Bauer and Gaskell, 2002b: 1)

The research for this book was based on a questionnaire survey on public perceptions of biotechnology, developed by the research team, that was added to the EU Eurobarometer survey. The group also conceptualised a series of national public spheres that are comprised by informal public attitudes studied through surveys; public media representations; and government policy. They argue that biotechnology is a complex of scientific and industrial activity at a global scale, which presents similar challenges to different national public spheres.

The Centre for the Study of Environmental Change (CSEC) at Lancaster University carried out some influential research into public attitudes in the UK at the end of 1996. This research will be discussed in more detail in Chapter 4 because it was sponsored by Unilever as a result of extended dialogue with environmental NGOs. The report, *Uncertain World*, was based on focus group discussions. It was important because it was one of the first pieces of credible social science research into public attitudes to GM foods which concluded that public attitudes were ambivalent towards the technology, and mistrustful of the motivations of the companies and regulatory agencies responsible for the technology (Grove-White *et al.*, 1997). Brian Wynne, one of the four authors of the report, has gone on to play a role as an advisor to the House

[4] This list of countries indicates the limited sense in which the term 'global' is used, which is repeated throughout discussions of public controversy over biotechnology.

of Lords Committee on Science and Technology when they wrote their report on Science and Society (House of Lords, 2000). This report is widely cited for its characterisation of the crisis of public trust in the governance of science in the UK. Wynne was also one of the lead authors of the European Commission funded research project on *Public Perceptions of Agricultural Biotechnologies in Europe*, published in December 2001. This report develops the approach of *Uncertain World*, but carries it across five European countries (France, Germany, Italy, Spain, and the UK).

Two other authors of *Uncertain World*, Robin Grove-White and Sue Mayer, went on to be appointed founder members of the UK Government's Agriculture and Environment Biotechnology Commission (AEBC). The AEBC was set up in June 2000 to give advice to Ministers drawing on its diverse membership, including as it does people with a range of perspectives from industry, the media, NGOs, natural and social sciences, and bioethics. The first report of the AEBC called on the UK Government to engage in a public debate to take fuller account of public views when determining its agricultural biotechnology policy. Robin Grove-White sat on the steering board of the "GM Nation? Public Debate" that was set up by the Government in response to this report.

As an indication of the way that the global scale of the GM crisis is established in part through the work of social scientists, Brian Wynne, Robin Grove-White and a manager from Unilever, Geraldine Schofield, who was involved in sponsoring *Wising Up*, also attended the Harvard conference on "Biotechnology and Global Governance: Crisis and Opportunity". At the conference they presented their collaborative work on public attitudes to industrial innovation of biotechnology. Venues such as that conference are sites at which a 'global' understanding of the phenomenon of public controversy is produced through encouraging people and their texts to circulate. The meeting had been organised by Sheila Jasanoff, professor of science and technology studies Harvard's Kennedy School of Government. Through the selection of academics, regulators and people from industry and NGOs a particular form of globalisation was being fostered. In this case it was a challenge to the US view that the crisis over GM foods was a peculiarly 'local' European problem.

In the USA there are several social scientists who have had a prominent role in translating 'public attitudes' for the agbiotech industry. Prominent among these are Susan Honig Priest from Texas A&M University and Thomas Hoban from North Carolina State. Both analyse publicly available questionnaire survey data. Illustrative of the approach is a presentation given by Hoban to an agricultural industry audience in November 2003: "Top Ten Reasons the World Does Not Want Biotechnology". In this presentation Hoban compared international data from surveys of public attitudes to GM foods. In particular, he concentrated on differences between European and US consumers. On one slide Hoban summarises what he argues to be the reasons behind European attitudes to GM foods:

> Europeans have valid reasons for their slowness in accepting GMOs
> - Biotechnology arrived on the EU market on the heels of mad-cow disease and other problems
> - EU consumers recognize no benefits from the first generation of GMOs
> - Questions remain for many about the long-term safety for the environment and human health
> - Given no clear benefits and the concern over risks, the EU position seems reasonable to their consumers
> - Europeans resent Americanization in all its forms, but particularly when it comes to food (e.g., McDonalds)
>
> (Hoban, 2003)

In conclusion, Hoban offers two main recommendations for the US industry. The first is that "people choose food based on emotion not logic" and the second is that "biotechnology benefits must exceed risks". This construction of the public with respect to biotechnology is one that underpins the public relations approaches of the agbiotech industry explored in Chapter 6. The public is conceptualised as forming opinions based on emotional responses, which are understood in opposition to logical and cognitive processes.

This section has briefly addressed three social science constructions of the public in the context of controversy over GM foods. In the first, public opinion surveys were used as indicators of the opinions of national publics. The approach of Bauer and Gaskell (2002a) is to explore how these public opinions are interrelated with media representations of biotechnology and government policy. In the second, focus groups are used to explore the ambiguities of public attitudes to biotechnology. The approach

of Grove-White *et al.* (1997), is to set ambivalent public expressions about biotechnology in the context of public reflections on the prevailing institutional cultures of risk assessment. In the third approach, which is influential in the USA, opinion polling and focus group data is used to construct 'public opinion' as the object of corporate strategies to achieve the public acceptance of biotechnology.

These social science techniques for researching public opinion and attitudes have become significant to governments and the agbiotech industry in the light of the failure of established regulatory mechanisms to achieve European public confidence in the introduction of GM crops. This thesis is not concerned with developing an argument about the attitudes of different publics. This thesis explores the ways that corporations with a stake in the commercialisation of GM crops have constructed representations of public attitudes. In doing so they have sometimes turned to social scientists to assist them. How these companies began to consider the public as citizens as part of their technology strategy is explored in the following section.

1.4 Corporations and their role in the governance of agbiotech innovation

Corporations are reflexive institutions to the extent that they are sites where the ordering of contemporary societies is reflected on as a problem. When talking about the governance of technology as a topic for social sciences it is important to understand that problematisation of this topic is not confined to universities; this endeavour connects sites across institutions of contemporary society, including academia, governments, NGOs, think-tanks, industry and media. As Nowotny *et al.* (2001) have argued, complex societies are co-evolving with complex problems in the governance of science and technology.

As this thesis explores corporate understandings of public controversy over GM foods, an important theme that emerges is the struggle over the definition of the corporation itself. One important dimension to the definition of corporate identity is found in the practice of executive leadership of the corporation. Both the legal status of a corporation as an individual able to enter into contractual relations, and its financial status as a body accountable to its shareholders, places great emphasis on the

character of the executive board and in the body of the chief executive. However, as this thesis demonstrates there are many other modes by which the corporation becomes an identifiable social actor.

One reason that corporations are important sites at which to study public controversy over GM foods is that they are central to the innovation of agricultural biotechnology. The following brief discussion illustrates the dominance of the agbiotech companies. There are currently only six multinational corporations that are conducting research in agbiotech with a view to marketing GM seeds. Of these six, Monsanto, DuPont and Dow are US-based, and Syngenta, Bayer and BASF are European. The following thumbnail account of the corporate mergers since 1982 of the companies now called Syngenta, Monsanto and Bayer comes from a report published by the UK AEBC (AEBC, 2002: 71-2) and financial analysis by Phillips McDougall (2000).

Monsanto has bought many seed companies since 1995, including: Asgrow Agronomics (soybean and maize, 1995), Calgene (1995-1997), Holden's Foundation Seeds (1997), DeKalb (1996-1998) and Plant Breeding International (1998). In 2000, Monsanto was the second largest seed company behind DuPont with $1.6 billion in seed sales. Although Monsanto dominated the agricultural biotechnology market: in 2003 it accounted for 90 per cent of the total area planted with GM crops (Monsanto, 2003b). Monsanto was itself then bought by the US-Swedish pharmaceutical company, Pharmacia & Upjohn, which then changed its name to Pharmacia. This new company then separated its agricultural interests, which it floated as an independent company called Monsanto.

Sandoz and Hilleshog merged, and later merged again with Ciba-Geigy to create Novartis. Meanwhile, ICI had split its lifesciences interests from the rest of its chemical business to form Zeneca, which bought Mogen in 1997. Zeneca merged with Astra to form AstraZeneca in 1999. The agricultural divisions of Novartis and Zeneca were then merged to form a separate company, Syngenta, in 2000.

Hercules and FBC were bought by Schering, which then merged with Hoechst (AgrEvo was the name of Hoechst agricultural division). Meanwhile, Rhone Poulenc had bought Roussel Uclaf. These companies then merged to form the Franco-German

company Aventis. Bayer has subsequently bought the agricultural interests of Aventis, which now form a core part of Bayer.

Another key acquisition was DuPont's purchase in 1999 of what was then the world's largest seed company, Pioneer Hi-Bred. In 2000 DuPont had the largest share of the global seeds market with $1.9 billion in sales (ETC, 2001). In the late 1990s Dow bought three seed companies, Mycogen in the USA (1995-1998), Morgan Seeds in Argentina (1996) and Dinamilho in Brazil (1998) to create the seventh largest seed company in 2000 (ETC, 2001; Phillips McDougall, 2000).

In presenting a history of Monsanto's involvement with agricultural biotechnology, one of Monsanto's executives highlighted four significant moments that led up to the large-scale commercialisation of GM crops in 1996:

> 1979 – Monsanto hires Howard Schneiderman, dean of biological sciences at UC Irvine, as chief scientist.
> 1982 – Monsanto Ag biotechnology research program established
> 1987 – First field tests
> 1995 – Commercial-use approvals for insect (Bt) and herbicide resistant crops
> (Fish, 2002: 4)

By the middle of 1996 Monsanto was dominating the agbiotech industry. It had demonstrated the success of its 'lifescience' business model, in which innovation across diverse markets was led by advances in biotechnology. The lifesciences model combined interests in product areas such as pharmaceuticals, agriculture and advanced materials, and was summed up by Monsanto's tag "Food – Health – Hope". To people within Monsanto, the successful first season of planting had demonstrated the wisdom of its early commitment to the revolutionary application of GM technology to agriculture. They did not imagine in less than five years the commercially punishing public controversy in Europe would lead to the end of Monsanto as an independent company and the demise of its lifesciences business model.

In 1998 Monsanto launched a $5 million advertising campaign in the UK and France that was designed to counter the growing anti-GM campaigns of NGOs such as Greenpeace (Repton and Stauber, 2001: 172). The advertisements appeared in the UK

weekend newspapers and presented arguments that agricultural biotechnology would contribute to alleviating world hunger, provide more nutritious food, and be kinder to the environment. The advertisements drew criticism from environment and international development NGOs. GeneWatch complained to the UK Advertising Standards Authority that the first two of Monsanto's advertisements were "dishonest and untruthful" (GeneWatch, 1999).

According to Monsanto's own internal public opinion research, which was leaked and widely reported, this advertising had coincided with growing public mistrust toward GM technology and public hostility towards Monsanto as the technology's chief proponent. The document noted that there was "an on-going collapse of public support for biotechnology and GM foods" and that "The Monsanto advertising campaign ... was, for the most part, overwhelmed by the society-wide collapse of support for genetic engineering in foods" (quoted in GeneWatch, 1999).

A crucial element of the approach I adopt in this PhD is to study corporations as sites of knowledge production. As I have argued, the agbiotech companies have come to understand that developing capacities to reflect on and intervene in public debates and controversy over biotechnology is an important part of their technology strategy. In this vein, I will leave the last word in this discussion of the way that public controversy was understood by the agbiotech industry to Stephen Smith. He was the CEO of Syngenta Seeds in the UK, Chairman of the agbiotech industry's UK public relations body, and also member of the Steering Board of the UK National Debate.

> I think that our original position, as scientists and people involved in agribusiness, we felt that the only people that this technology really touched were farmers, and that was a mistake. That also coincided with the change in public trust in public health and food safety, being wrested away from government regulators and given to the supermarkets.
>
> So the whole thing changed dramatically and that's far more fundamental than GM – that's the whole change with what we were all comfortable with nice linear chains going in and out of the regulatory box and passing to the next step, that's no longer the case, it's now a completely closed loop where the dialogue with the consumer, the retailer, the branded foods manufacturers is of paramount importance because technology and the technology of genetic development, and the technology that is used in food production now has a brand equity, and is seen very clearly to be positive, negative or neutral.

> Clearly at the moment, GM as a technology would be seen by UK retailers and branded goods manufacturers as having a negative impact on brand equity, therefore they walk away. They don't walk away from the science, they don't question the safety, they just say 'potentially damaging to my brand'. They put it in nice words saying – actually we are responding to consumer requirements, which is absolute cobblers, because they don't. Their whole life is predicting and leading consumer opinion as opposed to responding to it. So that was really what happened.
>
> (Smith, interview, 3 October 2002)

1.5 Governance of science and technology

Academic literature in both geography and science and technology studies has addressed the controversy over GM foods in ways that investigate how this controversy questions such basic categories as 'regulation' and 'public attitudes'. In particular, this thesis is located within literatures concerned with relations among public attitudes, controversy, regulation and governance more broadly. Work has been done on the regulation of biotechnology which is sensitive to the wider relations of science, technology and society (Wright, 1994; Jasanoff, 1995a; Jelsma 1995; Gottweis, 1998). There is also a rich stream of empirical studies focusing on the contested European regulatory regime (Levidow, 1998; 2001).

There has been a considerable amount of work on public attitudes to GM crops, particularly in Europe. An important contribution to this was made by the Unilever sponsored study discussed in Chapter 4 (Grove-White *et al.*, 1997) and similar work has followed this approach (Marris *et al.*, 2001). Whatmore has contributed to this area by arguing that controversies over GM foods can be understood in terms of people's visceral relationship with transgenic food (Whatmore, 2002: Chapter 6). A group of international scholars have concentrated on the relations between public attitudes, media representations and regulation of GM technology (Durrant, Bauer and Gaskell, 1998; Bauer and Gaskell, 2002a).

There have been studies that have explored the ways that institutions have constructed particular categories of 'the public' in the context of controversy over GM foods (Grove-White *et al.*, 2000; Irwin, 2001; Marris *et al.*, 2001; and Wynne, 2001). Two

of these studies include interviews with people from industry in order to explore how they talk about the public and public attitudes to GM foods (Grove-White *et al.*, 2000; Marris *et al.*, 2001). However, these studies do not place these industry views in an organisational context, rather they use them to construct an image of an overall 'official' culture of risk regulation operating across government and industry. Similarly, Marsden (2004) has discussed the relations between corporate policy and EU regulations over GM agriculture at a macro level. Interestingly, for a detailed treatment of corporate strategy in relation to the GM controversy there are several well researched books by journalists. These books tend to adopt a 'revelatory' style which seeks to uncover corporate interventions in government policy-making and public debates, an approach which does not call into question the 'corporation' as a rational actor maximising its interests (Charles, 2001; Lambrecht, 2001; Rampton and Stauber, 2001; Rowell, 2003a).

The events that I have described as making up a global controversy over GM weave together discourses, practices and people, which link specific places and moments. The research strategy of agbiotech corporations produces networks of corporate, university, and government laboratories around the globe. Their marketing strategy has focused on commodity crops like soya, maize and cotton that are grown, traded and shipped internationally. The companies have engaged in debates about setting regulatory systems and have policies to comply with these systems that are at once national and global: dealing with the UN during negotiations on the Cartagena Protocol, the World Trade Organisation (WTO), the Food and Agriculture Organisation (FAO), and the World Health Organisation (WHO). Since the public controversy gained momentum during 1998, the category of 'the public' has been added to the global imaginary of the agbiotech corporations.

Questions of how the corporations should develop strategies to engage with a global public have emerged during the last five years at the same time as wider questions of governance have risen up the 'global' political agenda. Questions about the proper governance of global capital flows and multinational corporations have arisen as nation states lose their credibility as political units able to manage the contemporary capitalist political economy. And questions of the regulation of technological risks to

human health and the environment have arisen as scientific expertise loses its credibility as a sufficient resource for ensuring the legitimacy of political regulation.

These questions of global governance came together with an emergent global public during the WTO summit in Seattle in late 1999. Vandana Shiva led calls for an international five year moratorium on growing GM crops, and anti-GM protesters on the streets were recognisable in their butterfly suits, a visual reference to the research published earlier that year on risks from GM crops to monarch butterfly larvae. The agbiotech industry was also in Seattle and held daily press briefings together with pro-GM scientists and members of the US Congress (Lambrecht, 2001: 329-45).

The approach I take in this thesis is to explore how this emergent global public, and its localised manifestations, are being understood and interpreted by the multinational corporations who have a stake in the commercialisation of GM crops. My starting point is that these various publics have become newly significant actors in corporate technology strategy. An important element in how these publics become meaningful in the governance of biotechnology is through the instruments, techniques, discourses and practices that corporations have developed to represent and engage with 'the public'.

Jasnaoff (2003a) has argued that contemporary societies are experiencing a moment of political upheaval provoked by challenges to the established relations between science and society. She argues that settled arrangements among institutions, citizens and forms of expertise are unravelling, giving rise to new subjectivities, new modes of knowing and new forms of political arrangement. This thesis explores the corporation as a site for the production of knowledge, both technological and social, in the context of this wider 'constitutional moment'.

1.6 Thesis outline

Chapter 2 develops a theoretical approach to studying the co-production of particular forms of citizenship with corporate institutional arrangements for engaging with public controversy. The chapter argues that exploring the construction of citizen-like

subject positions provides a route to studying contemporary controversies as moments in the re-writing of wider constitutional arrangements. It then turns to approaches in economic geography to study the corporation as a social actor whose identity emerges from competing discourses; and to science and technology studies to study the corporation as a site of knowledge production. The chapter then argues that corporations can be understood as 'performing' themselves in relation to external and internal audiences. These performances are produced by material and discursive strategies for framing the corporation's relations with its publics. It points to an analysis of the ways that these modes of framing are innovating new political figures and spaces.

Chapter 3 provides an account of my methodological approach to the topics investigated in this thesis. It describes how I came to select the sites and cases that I study. The chapter also discusses my ethnographic approach, in which my situation as a researcher studying the corporations is central to my analysis of corporate constructions of their boundaries. The research is itself understood as a series of moments in the performance of corporate openness and accountability. The organisation of the following three chapters emerged from my experience in the field of corporate self-performance. The companies I followed performed themselves using three over-lapping repertoires: 'dialogue', 'transparency' and 'public relations', which I treat in Chapters 4, 5 and 6, respectively.

Chapter 4 investigates how DuPont, Monsanto and Unilever have framed their relations with the public in terms of a dialogue. This chapter shows how the corporate performances of dialogue are embodied by their chief executives. It then follows how the three companies have institutionalised dialogue differently, and thereby construct a particular version of public concerns through enrolling experts on issues related to controversy over GM foods. The chapter then explores in more detail Unilever's NGO dialogue and the social science research it sponsored through its collaboration with NGOs in the UK. The chapter argues that these forms of dialogue are framing the public as 'consumer-citizens' with nascent rights to participate in the formulation of corporate biotechnology strategy.

Chapter 5 explores how DuPont and Monsanto have simultaneously framed their relations with consumer-citizens in terms of corporate transparency. This chapter traces the processes by which both DuPont and Monsanto attempt to achieve transparency through the provision of information on the companies' websites. Corporate transparency requires the combination of texts, materials and bodies in a carefully choreographed assembly. The construction of corporate transparency also assumes particular subjectivities for whom this form of transparency is performed. The chapter examines the assumed capacities of this consumer-citizen in terms of their ability to engage with the scientific questions about biotechnology, and their agency with respect to corporate decision-making.

Chapter 6 describes the two public relations bodies: CBI in North America, and ABC in the UK. The chapter is concerned with the corporations' turn to public relations professionals, and discusses how the techniques of public relations frame the relations between the agbiotech industry and the public. The public relations tools that CBI and ABC employ engages with the media by intensifying the process of news production and, in this way, the organisations contribute to a particular formation of the public sphere. The chapter explores the ways that these initiatives frame public opinion in terms of emotional responses to media messages.

Chapter 7 concludes the thesis by returning to the two central themes of this introductory chapter. First, a concern with the spaces in which corporations are performing themselves in the context of public controversy. Second, the interplay among different constructions of consumer-citizens, corporate innovation, and public controversy over GM foods. It explores the corporate modes of framing as political innovations which reframe the governance of biotechnology. In particular it explores the category of 'consumer-citizen' with respect to the three modes of framing of dialogue, transparency and public relations. Finally, it assesses the character of the emergent citizen-like rights and explores the implications of these for understandings of the politics of technology.

Chapter 2

Citizenship and corporate innovation: modes of framing consumer-citizens and socially responsible corporations

2.1 Introduction

During the 1990s global public controversy over GM foods took the agbiotech corporations by surprise. As Chapter 1 explained, this controversy presented the companies with a challenge to their global strategies for commercialising GM crops. By the end of the decade the companies had announced that they would change the ways that they interacted with wider society over biotechnology's risks and benefits. DuPont and Monsanto led the other four agbiotech companies in making public declarations that they would tackle the crisis of legitimacy by re-establishing public trust in the corporations and innovators of biotechnology.

In this chapter the crisis of public legitimacy in the corporate innovation of biotechnology is understood in the context of wider controversy over the governance of science and technology. As the entanglements of science and society proliferate they challenge established political orders. For example, the promised benefits and potential risks of personalised medicines, global climate change and GM foods all present new ways of conceptualising political subjectivities and authority. Controversies over the governance of such entanglements disrupts the established separation between ways of organising social relations in the world on the one hand, and ways of producing credible knowledge about the world on the other. Jasanoff (2003a) has identified the challenges that such controversies pose to established political orders as amounting to a moment of constitutional crisis. I argue that controversy over GM foods and the responses of the corporations should be understood as elements making up this constitutional moment.

Underpinning this theoretical discussion is my commitment to the relational approaches developed in geography and science and technology studies. In this chapter I develop a co-productionist approach to exploring corporate innovations of new institutional forms in the face of controversy over the governance of biotechnology. The term 'co-production' and the related concept of hybrid geographies grapple with the mutual constitution of epistemic and social orders (Latour, 1993; Whatmore, 2002; Jasanoff 2004a). In other words, the identity of an actor is a relational achievement that emerges simultaneously with the actor's ways of knowing about the world. This approach eschews grand narrative explanations and it denies the foundational status of the binary division between nature and society. Taking a co-productionist approach to studying corporations means that I treat them as sites of knowledge production, and as actors in the social world. The approach also recognises that there are no essential boundaries that define 'the corporation', rather it is constantly in the process of being produced. However, this does not overlook the power of such relationally achieved actors. Multinational corporations are the product of a vast array of resources that extend and stabilise 'the corporation' as a powerful political economic actor.

My concern in this chapter is with the co-production of institutional arrangements of corporate biotechnology innovation and new configurations of citizenship. Following work in science and technology studies, I adopt a broad definition of technology. I am concerned with the sociotechnical ensemble that is required for the technological artefact to operate successfully.[5] This ensemble includes the social and institutional arrangements that support, and are in turn supported by, the artefact (Law, 1991; Bijker and Law, 1994; Bijker, 1995; Latour, 1996). In the context of controversy over GM technology, there has been a proliferation of innovative social institutions designed to support the commercialisation of the technology. Since GM crops were first grown commercially in 1996 the range of GM crops on or near the market has not changed significantly. However, during this time the way that the agbiotech corporations have conceptualised the public in relation to agbiotech innovation has undergone a revolution. I am concerned with the co-production of biotechnology in this wider sense along with new forms of citizenship.

[5] The term sociotechnical ensemble is taken from Bijker (1995).

In this chapter I propose an approach to studying the relationships between the 'responsible corporation' and 'technological consumer-citizens'. I am interested in how these two categories are materially and discursively constructed as normatively significant. This framework allows a discussion of the qualities of accountability that are created through corporate framings of 'the public' in the context of contemporary governance of biotechnology.

The structure of this chapter follows from my concern with co-production. In section 2.2, I explore the significance of the concept of citizenship in debates about the governance of technology. I refer to work in sociology that defines the capacities of citizenship with respect to particular institutions. While these institutions have often been emanations of the nation state, in the context of technological and environmental risks the range of expression of citizen rights is extended. The section then goes on to explore the ways that the idiom of co-production can be used to study the contemporary emergence of new forms of citizenship. This section develops an approach to conceptualising citizenship rights with respect to corporate technological innovation. It argues that corporations are having to recognise the assertion of citizen-like rights by its consumers, and by doing so these companies are configuring the category of 'consumer-citizenship'.

In section 2.3, I develop an approach to studying the multinational corporation as a site at which particular forms of citizenship and technology are emerging. I turn to work in economic geography and agro-food studies that have combined concerns of political economic geography with a post-structuralist interest in the construction and contestation of economic actors' identity and practice. Work in geography emphasises the combination of rhetorical, material and embodied practices that go into making up a corporation, which echoes Law's (1994) conception of an organisation being constituted by 'modes of ordering'. I then consider the ways that corporations construct the situations in which they interact with their 'consumer-citizens'. To do this I turn to Callon's study of the construction of markets through processes of 'framing' the interaction of actors in the market place (Callon, 1998).

In section 2.4, I combine approaches to the corporation as a site at which new forms of citizenship are emerging with discursive theories of the firm developed in

economic geography. This section develops an understanding of the corporation as engaged in a continuous process of performing itself to a diverse range of publics. My study of corporate engagements in public controversy is based on my role as a member of a public audience for corporate performances of themselves. I have also carried out research interviews in which individual corporate spokespeople perform their company in the specific context of a semi-structured interview. In adopting this approach, I am using Hillgartner's study of the staging of institutional legitimacy through textual performances (Hillgartner , 2000). Finally, in section 2.5 I set out the research questions that run through the following chapters of this thesis.

2.2 Towards an understanding of the co-production of consumer-citizenship

Agricultural biotechnology corporations have found themselves in the middle of complexities that cut across the realms of epistemic, political and social order. During the course of the 1990s uncertainties have multiplied for companies investing in agricultural biotechnology research. As Chapter 1 has argued, questions that were settled at the start of the decade have been re-opened as GM crops reached the market. Questions such as: what counts as appropriate knowledge in regulating GM foods and, are established forms of risk assessment able to cope with scientific uncertainty? Who is effected by biotechnological innovation and whose voice is heard; should consumers have the 'right to choose' provided through the labelling of foods containing GM ingredients? Which are legitimate authorities in the governance of GM; are corporations out of control; will GM technology concentrate political and economic power in the hands of multinational companies? These questions illustrate the increasing complexity confronting the agbiotech corporations as they attempt to manage the innovation of GM foods. Inserting itself into the companies' strategic calculations is the actor of 'the public', who increasingly asserts citizen-like interests in corporate technological innovation.

The concept of citizenship is central to liberal democratic political orders. It is a term whose meaning and practice is the focus of constant conflict and debate in contemporary Euro-American societies. It is a term which is being stretched and extended in controversies over the governance of environmental and technological

risks. 'Citizenship' is being transformed in this context because of the disruption of modernist distinctions between social and political order on one side, and natural and material order on the other. Increasingly, citizens are claiming their rights as knowledgeable subjects to participate in scientific controversies. Understandings of citizenship are also being transformed by changes in the range of authorities with respect to which citizenship rights and duties are expressed. In the 'post-national' condition in which many scientific controversies are experienced, the state is only one among many relevant institutions, which include multilateral agencies, NGOs and corporations. In this section, I explore the conceptual foundations of citizenship and some of the recent uses to which this term is put by academic literature concerned with questions of science, technology and the environment.

In this section I begin by placing my concern with the concept of citizenship in the context of contemporary scientific controversies. I then go on to introduce a sociological approach to citizenship, which locates the roots of this concept in the emergence of the Euro-American nation state. I explore how citizenship has been used in analyses of technological and environmental governance. These approaches are useful in demonstrating the political dimensions of risk regulation, however they do not reflect on how discourses and practices of citizenship are transformed through their extension beyond the institutions of modern politics. In order to develop an approach that allows me to consider how the term citizenship is emerging as a useful category in controversy over GM technology, I turn to literature in science and technology studies on co-production. This argument highlights the relational emergence of new forms of citizenships with new institutional and technological assemblages.

Citizenship and GM foods in a 'constitutional moment'

Jasanoff (2003a) has argued that contemporary scientific controversies arise as a consequence of increasingly complex entanglements of science and society. She argues that these entanglements are posing challenges to established constitutional arrangements that govern the relations of people and institutions within a polity. The term 'constitution' focuses attention on the relations between institutions that have

authority to govern both science and the social order, and the bearers of rights to whom these governing authorities are accountable. Jasanoff charts the ways that current controversies over science and society are destabilising the existing modern constitution, which according to Latour (1993) depends on maintaining the distinction between nature and society.

The proliferation of such controversies has led Jasanoff to identify a 'constitutional moment' in which the existing social and scientific orders are experiencing transformation. The process of re-establishing modes for ordering science and society relations are likened by Jasanoff to the writing of a new constitution. It is in this context that the concept of citizenship becomes a lively analytical category. By studying the ways that the term and practices of citizenship are invoked in scientific controversies, it is thus possible to trace the contours of wider constitutional wrangles.

Jasanoff's analysis of scientific controversy in terms of constitutional change is the continuation of a trend in science and technology studies which has extended its interest in processes of knowledge production beyond the institutions of science. Seminal early work was focused on the production of knowledge in the laboratory, or within a scientific discipline (Latour and Woolgar, 1979; Collins, 1985). This approach was then also applied to the social construction of technology, which extended analysis of knowledge production to include the technology's inventors and users (Bijker, Huges and Pinch, 1987; Law, 1991; Bijker and Law, 1992). Studies also began to trace the links between knowledge production in scientific laboratories and other sites. Such work suggested that scientific knowledge produced 'within' the laboratory is co-produced with material and social orders 'outside' the laboratory (Callon, 1986; Latour 1988). This trend has continued, and Jasanoff has contributed to the study of the inextricable connections between knowledge production and application in government policy-making and legal contexts (Jasanoff, 1990; 1995b).

Following this understanding of contemporary societies as suffused by processes of knowledge production, Jasanoff argues that quasi-constitutional understandings of the relationship between science, technology and society take shape in the context of a myriad of particular institutions including law courts, scientific advisory bodies, regulatory agencies, university laboratories, NGOs, and also corporations. This

approach suggests the possibility of empirical engagements with the specific locations at which constitutional controversies are played out. For example, agbiotech companies must weigh up different framings of the risks of biotechnology when developing GM crops. Investigating such sites allows for an exploration of the stabilisation of particular settlements, in this case between the credibility of different knowledge claims. As these settlements become stabilised, so do the normative implications of any given arrangement, such as who has a voice in debates about assessing the risks of GM crops.

The contemporary constitutional moment cannot be fully grasped by reference to formal legal principles, according to Jasanoff. Instead of focusing on the abstract social and political structures of constitutional governance, Jasanoff calls for greater attention to be paid to the everyday practices of reaching such constitutional settlements in the contexts of widely dispersed institutions:

> We must ask instead how norms of constitutional relevance are tacitly constructed in the daily hum of technological societies: norms that are embodied in technological standards and practices, hardened into material instruments and artefacts, entrenched within professional discourses and legitimated through public policy.
>
> (Jasanoff, 2003b: 166)

At the heart of this understanding of a constitutional moment is the observation that the contemporary entanglements of science and society are producing new objects and new subjects which challenge established political orders. For example, GM foods are new objects of the system of intellectual property rights; they are new objects of agro-food chains; and new objects of environmental and public health regulation. The controversy over GM foods also configures new subjects. The relationships between the agbiotech companies and the end consumers of their GM crops are challenged by the voicing of citizen concerns over the questions posed by the governance of GM foods.

In the same chapter on the constitutional approach, Jasanoff argues that the changing relations between corporations and their publics over controversial technologies represents one of the places to look for the workings of a new constitutional

arrangement (Jasanoff, 2003a). This approach draws attention to the capacity of the corporation to take account of consumers' citizen-like perspectives, which gives rise to a new subjectivity, that of the 'consumer-citizen'. The emergent capacities of 'consumer-citizens' to participate in political processes of governing corporate innovation is a challenge to the way that scientific controversies are currently theorised. The empirical approach I adopt to controversy over GM foods treats corporations as sites of knowledge production. These corporate processes not only construct GM foods, but also configure new subjectivities of consumers and citizens. Corporate engagement with public controversy is therefore a site at which norms of public participation and corporate accountability are emerging.

Citizenship and the nation state

The concept of 'citizenship' is central to contemporary Euro-American understandings of democratic politics (Turner, 1990; Ellison, 1997; Isin, 2002). Turner discusses the historical and sociological processes that have given rise to the understanding of citizenship as a bundle of rights and duties that relate an individual to a polity (1990). However, Turner argues that the concept of citizenship should not be approached only as a formal, political theoretical term. Citizenship is also a valid topic for sociological investigation because it can be understood as an achievement of social practices that have consequences for distributions of resources within society:

> Citizenship may be defined as that set of practices (juridical, political, economic and cultural) which define a person as a competent member of society, and which as a consequence shape the flow of resources to persons and social groups.
> (Turner, 1993: 2)

Turner argues that rather than understanding citizenship as a trope of bourgeois liberal societies that functions to justify private property and disguise economic inequalities, it should be understood as the outcome of Euro-American struggles to accommodate social solidarity, universalism and individual liberty. Here, Turner is working in the tradition of T. H. Marshall (1977), whose influential study of British citizenship was rooted in a concern with the stability of the post-Second World War welfare state. Marshall understood the emergence of citizenship as the result of a historical process,

beginning in the eighteenth century, when legal rights of individual members of nation states were encoded, giving rise to civic citizenship. In the nineteenth century, these rights were extended to include political representation, creating political citizenship. During the twentieth century social rights were extended in the form of welfare state provisions to overcome economic inequalities arising from the liberal social order.

Turner is critical of Marshall's tendency to theorise citizenship in monolithic terms across political cultures. In contrast, Turner develops a typology of citizenship that is rooted in the national political cultures of the countries in which the particular forms of citizenship take shape. Tracing the historical development, particularly in Germany, France, England and the USA, Turner highlights differences between 'bottom up' versus 'top down' processes, and public versus private spaces:

> In France, a revolutionary conception of active citizenship was combined with an attack on the private space of the family, religion and privacy. In a passive democracy, citizenship is handed down from above and the citizen appears as a mere subject (the English case under the seventeenth century settlement). In a liberal democratic solution [American liberalism], positive democracy emphasises participation, but this is often contained by a continuing emphasis on privacy and the sacredness of individual opinion.
>
> (Turner, 1990: 209)

Turner's work is helpful in pointing to the historical and social specificity of the emergence of practices of citizenship. Of particular interest to this thesis is the relationship between citizenship and consumption. The private realm of consumption is intimately bound up with the public realm of citizenship, as is implied by Marshall's notion of social rights to economic participation. Historians make this point through studies of the rise of mass consumption during the late nineteenth and twentieth centuries. The contingent relationship between citizenship and consumption is illustrated by Trentmann's study (2001) of the transformation of consumer politics in England. During the Edwardian era there were strong popular movements for free trade. The vibrant consumer politics of a radical free trade movement in England during the first years of the twentieth century called for rights to affordable bread. Consumer politics changed during the course of state regulation of consumption during the Second World War, and popular movements championed the state

regulation of food safety. These citizens' rights to consumption were expressed nationally.

The analytical category of such historical research is the 'citizen-consumer', or citizen as consumer. This category remains of great contemporary significance, and has been applied in studies of neo-liberalism that are concerned with forms of government that are not confined to the nation state. Rose discusses trajectories of the citizen-consumer as part of the wider processes of liberal, enterprise regimes:

> Citizenship is no longer primarily realized in a relation with the state, or in a single 'public sphere', but in a variety of private, corporate and quasi-public practices from working to shopping. The citizen as consumer is to become an active agent in the regulation of professional expertise; the citizen as prudent is to become an active agent in the provision of security; the citizen as employee is to become an active agent in the regeneration of industry and much more. Even in politics, through new techniques such as focus groups and attitude research, the citizen is to enact his or her democratic obligations as a form of consumption.
>
> (Rose, 1999: 166)

The concept of citizenship is thus understood as having its origins in the context of particular national political cultures, and the citizen is understood as the bearer of rights, which have changed over time. In these terms, citizenship is articulated through the institutions of both the state and the market. Rose (1999) and Trentmann (2001) talk about the citizen-consumer, or the subject whose citizen-rights include the right to consumer goods in the market place. I am concerned with the corollary, the consumer-citizen: a consumer who has citizen-like rights with respect to a corporation. As such the consumer-citizen becomes an active participant in technological innovation. This raises important questions about the polity to which such 'technological consumer-citizens' belong, and the institutional guarantees that are associated with this new form of citizenship. To follow Turner's point, these new forms of citizenship are not constructed in conditions of enterprises' choosing, but exist in the context of long-running historical processes. They are, to use Jasanoff's phrase, constructed in 'the hum' of technological societies, for example in the course of risk regulation. In the following sub-section I review academic literature that has demonstrated that citizen rights extend to involvement in the governance of technological and environmental risks.

Technological citizenship: projects for humanising technology

The concept of 'technological citizenship' has been developed in the USA in the light of Winner's work on the politics of technological systems (1977, 1986). In his famous article, "Do Artifacts Have Politics?", Winner elaborates a theory of 'technological politics', which pays attention to the ways that technologies embody particular forms of social order. Winner is critical of social scientists who do not consider the obduracy of artefacts as having political significance, and who fall back on traditional social explanations for the politics of technology. Winner's analysis points to "the ways human ends are powerfully transformed as they are adapted to technical means" (Winner, 1986: 21). According to Winner, technological politics should pay attention to the ways that technological systems reproduce social orders. He separates technologies that can be designed to have social consequences, such as some industrial process technologies, from those technologies that are inherently compatible with particular social orders, such as nuclear power. In the case of the former category, Winner argues that the implementation and management of these technologies should be opened up to democratic processes. The dangers of failing to do this are illustrated by Winner's now famous example of the construction of bridges on Long Island, New York. According to Winner's version, the urban planner Robert Moses had designed bridges crossing the road leading to the Jones Beach public park to be too low for buses to pass underneath. The bridges thus exclude public transportation and the low-income groups that use the buses, leaving the park for the predominantly white middle class.[6]

The second class of political technologies identified by Winner are those that are 'inherently political', which means that the technological system itself produces particular forms of social order. Winner cites the necessity of a centralised and authoritarian state to manage the risks and infrastructure demanded by nuclear power generation, as opposed to the more decentralised social organisation compatible with forms of solar energy. However, whether it is the technology system itself, or its specific implementation that is political in consequences, Winner argues that analysis should pay attention to the ways that technologies legislate human affairs:

[6] Alternative accounts of Moses' bridges and their interpretation by Winner are provided by Joerges (1999) and Woolgar and Cooper (1999).

> The things we call technologies are ways of building order in our world. Many technical devices and systems important in everyday human life contain possibilities for many different ways of ordering human activity... By far the greatest latitude of choice exists the very first time a particular instrument, system, or technique is introduced. Because choices tend to become strongly fixed in material equipment, economic investment, and social habit, the original flexibility vanishes for all practical purposes once the initial commitments are made. In that sense technological innovations are similar to legislative acts of political foundings that establish a framework for public order that will endure over many generations.
>
> (Winner, 1986: 28-9)

Following Winner's argument that the technological design is an inherently political process, Frankenfeld develops a normative account of technological citizenship as part of his goal to define a "constitution for technological society" (1992: 459; see also Zimmerman, 1995). Frankenfeld's paper is located squarely within Winner's project of exposing the politics inherent in technological systems in order to democratise technology. Frankenfeld defines technological citizenship as:

> Equal membership, participation, and standing or status of persons as agents and subjects within a realm of common impact to at least one "technology" – or instance of consciously amplified human capacity – under a definable state that governs this technology and its impacts. Such status is defined by a set of binding, equal rights and obligations that are intended to reconcile technology's unlimited potentials for human benefit and ennoblement with its unlimited potentials for human injury, tyrannization, and degradation.
>
> (Frankenfeld, 1992: 462)

Frankenfeld's definition of technological citizenship is concerned with democratising technology in terms of its 'impacts' on society. The polity is defined in terms of the scale of technological impacts. Frankenfeld creates an important distinction between the rights of lay subjects and innovators, which periodises technology, separating its innovation from it impacts.

For both Frankenfeld and Zimmerman technological citizenship is a concept for democratising the governance of technologies. Technological citizenship is taken to stand for the humanising of technological systems, which can be achieved through the foundation of formal constitutional rights. In Winner's terms, it is about adapting technological means to meet human ends.

The term 'technological citizenship' as developed by Frankenfeld (1992) and Zimmerman (1995) has also been taken up by Ulrich Beck in his discussion of 'risk society' (1999: 19-47). According to Beck's risk society theory the concept of 'risk' is used to question the ability of modern state institutions to cope with ecological risks that cannot be contained by national boundaries, nor predicted accurately by scientific risk assessment. The challenge to formal political institutions of government comes, according to Beck, from the emergence of a sub-politics through which citizens identify themselves with single issue campaigns at a global scale, of which the global controversy over the risks of GM foods is an example. Beck's risk society considers tensions of political and social orders, but overlooks tensions of epistemic orders. Wynne (1996) critiques Beck's conception of the risk society for its lack of attention to the practices of producing, contesting and circulating knowledge claims about ecological risks.

There have however been approaches which do explore the epistemic dimensions of citizenship. Running in parallel to discussions of 'technological citizenship' has been the elaboration of the concept of 'environmental citizenship'. Debates starting in the 1980s about sustainable development provided a new ground in which citizen relations with forms of expert authority were brought into question. In his book *Citizen Science* Allan Irwin (1995) advocates a greater role for citizen participation in science policy making. Irwin used the term 'environmental citizenship' to emphasise an active and knowledgeable public. Irwin described tensions between lay citizens' knowledge of local impact of technological hazards and expert-driven regulatory processes.

> [T]raditional treatments of citizenship have concerned themselves very little with questions of knowledge and expertise. While such questions overlap with matters of empowerment and democracy, they also bring a new element into focus: the linkage between ways of knowing and of acting.
>
> (Irwin, 1995: 178)

Citizen Science is a critique of established risk regulation in Britain. Irwin argues that established regulatory institutions fail to recognise the relevance of local communities' own knowledge about environmental risks, as in the case of risks of disaster at industrial plants. Referring to a specific case of a public information

campaign to residents near a chemical plant in northwest England, Irwin argues that it treated the public as ignorant "*tabula rasa*" and, by ignoring their local experience, provided information that was ignored by the local community. Official public information campaigns failed to appreciate the endemic scientific uncertainty in policy making; and the open nature of environmental problems in which technical and social questions are intimately interconnected. This is an example of what Irwin, and others, have called the 'deficit model' of the public understanding of science. According to this model, governments assume that the public suffers from a deficit of knowledge, which can be addressed by supplying scientific information. This model overlooks lay knowledge, and ignores the possibility that there may be intellectually valid reasons for holding views counter to those of the official risk assessors.

As an alternative to the reductionist, top-down models of risk regulation, Irwin poses the concept of environmental citizenship. Drawing on Beck (1992), Irwin argues that this form of citizenship is allied to sub-political social movements, which validate local knowledge and empower citizens through strategies such as consumer activism:

> [W]e can see the possibility of an approach to sustainable development which is rooted in the preferred living practices and social arrangements of citizens rather than in accepted institutional arrangements and unchallenged relations of knowledge and power.
>
> (Irwin, 1995: 180)

The concept of environmental citizenship, like its sibling, technological citizenship, emphasises the potential to democratise reductionist risk discourses through increasing public involvement in strategies to achieve sustainable development.[7] Burgess *et al.* (1998) have used the term environmental citizenship in their study of the implementation of Local Agenda 21 programmes in two European cities.[8] Environmental citizenship, here, describes the construction of local publics as active participants in environmental schemes. Environmental citizens achieve 'ownership' of

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[7] The concept of 'environmental citizenship' also implies individual responsibility for environmental harm, through a public understanding of the consequences of consumption practices.

[8] Local Agenda 21 is the name given to one of the agreements reached at the UN conference on Sustainable Development held in Rio in 1992. It is a scheme for advancing sustainable development agenda at local levels by ensuring a partnership between national and local governments and local communities.

local projects such as habitat creation and recycling over which they have some control.

In the literatures on technological and environmental citizenship, the subject of the citizen is counter-posed to technocratic models of policy making. While this has provided useful critical insights on the reductionist tendencies of much risk regulation, it has failed to take full account of the implications of these issues for the concept and practice of 'citizenship'. Citizenship is not a stable category that can be straightforwardly extended to new domains as a tool of democratisation. It is rather an achievement of particular discursive and political arrangements. This is implicitly acknowledged in discussions of environmental and technological citizens as knowledgeable subjects.

Rather than having to choose between focusing on the political developments of citizenship on the one hand or the management of technological risks on the other, I am interested in studying their co-production. In the case of controversy over the governance of corporate biotechnology innovation, I argue that what is happening is more than an extension of the range of the stable category of citizenship. New subjectivities are being invoked through corporate attempts to reframe their relations with newly significant publics. This is happening at a time when many official institutions have identified a global crisis of public trust in science. These institutions, including corporations, have turned to discourses and practices of democratic governance in attempts to repair this loss of public trust. In the following sub-section I explore the vocabularies of public participation and accountability that are brought into play in answer to this crisis of trust.

Dialogue and transparency as conditions for developing citizenship

Work inspired by Winner on technological citizenship, and also that on environmental citizenship, are closely allied to advocacy of direct democratic processes that include lay people as citizens in environmental and technical policy making (Bloomfield *et al.*, 2001; Guston and Sarewitz, 2002; Pellizzoni, 2003). Arguments for greater public participation in risk governance, or 'deliberative and inclusionary processes' of policy

making, are based on two distinct rationales – one epistemic and one democratic. According to such arguments, greater public participation in risk policy making improves policy outcomes due to the inclusion of a wider range of knowledges, which include a greater appreciation of the context and highlights the inherent uncertainties of a reductionist approach to risk assessment. Public participation, according to its advocates, also improves the democratic legitimacy of the process by opening up domains of technical discourse to public debate (Munton, 2003).

In the recent book *Science, Social Theory, and Public Knowledge*, Irwin and Michael (2003) pick up some of the themes of environmental citizenship as it has developed in "post-BSE" Britain. The authors argue that formal institutions have incorporated some elements of the sub-political pressures that gave rise to environmental citizenship. Exploring its top-down institutionalisation, Irwin and Michael refer to UK and EU documents, white papers and reports, and observe:

> In terms of citizenship, there appears to be a broad acceptance of the wider importance of citizens within decision making – and especially of the significance of public values. 'Dialogue' is preferred over one-way communication. Without public support, innovation cannot take place. Trust in scientific institutions becomes a central dimension of governance. Trust can only be developed through greater transparency, openness and two-way communication. The public has in some way become an essential ingredient within scientific governance.
>
> (Irwin and Michael, 2003: 56)

Corporations, such as those involved with GM foods, have found themselves having to engage with the crisis of public trust in scientific institutions. It is no longer sufficient for them to receive regulatory approval for a new technological product, they are now forced to engage in a wider public debate about the risks and benefits of biotechnology. In taking part in such debates, multinational corporations are acknowledging that they are not only answerable to their shareholders, and responsible for complying with national laws and regulations, but that they are also accountable to 'society'. This understanding is currently common across all business

sectors, and is often discussed under the banners of 'corporate social responsibility' or the 'stakeholder corporation'.[9]

Across many social domains there has been a dramatic increase in calls for accountability and the implementation of systems designed to achieve accountability (Power, 1997; Strathern, 2000a). Central to this turn to accountability as a solution to the challenges of contemporary governance is the concept of 'transparency'. Transparency is a concept that has an important place in cultures of both liberal democracy and experimental science. In his major contribution to the study of technoscientific culture and its relations with modern liberal democratic order, Ezrahi argues that the coexistence of norms of private freedom of action and norms of collective public goods have been possible due to the establishment of scientific culture (Ezrahi, 1990). The Euro-American political revolutions at the end of the eighteenth century expressed a commitment to representative democracy that was underpinned by assumptions about the construction of political facts. The strength of these assumptions owes much to the establishment of experimental science from the seventeenth century onwards as the principal institution for the production of authoritative knowledge.

Models of representative democracy rely on the mutual transparency of a central authority and its citizenry. Both freedom of the private citizen and collective public action by the state are deemed consistent due to the ability of the centralised authority of government to observe and act on the aggregate will of its citizens. The power of the centralised state to act in the public interest can be held in check and made accountable according to the assumption that citizens can in turn observe the actions of their government. Ezrahi argues that scientific culture has played a significant role in articulating the concepts of public observation of an objective political reality.

By reference to Shapin and Schaffer's (1985) study of the emergence of a culture of experimental science in late seventeenth century England, Ezrahi draws attention to the practices through which public knowledge is produced. The staging of

[9] See, for example, a guide book written by two executives at The Body Shop titled *The Stakeholder Corporation* (Wheeler and Sillanpaa, 1997). This book is quoted on Monsanto's website as providing the framework for its stakeholder dialogue.

experiments at the Royal Society has a parallel in the shared witnessing of political events, which lies at the core of modern commitments to liberal democratic politics. As with the construction of scientific facts, so political acts are performed in a carefully crafted public space with the intention of creating a shared commitment to the matters of fact being demonstrated.

Transparency as a term of political discourse is directly linked to a commitment to accountable public action by the state. Ezrahi argues that the objectification of the political act as public spectacle provides a means for holding political agents to account for their actions, and provides a bridge for the "gaps between ideals of equal participation and the realities of the unequal distribution of power" (1990: 68). This approach is an example of a modern western cultural commitment to the observable fact: 'seeing is believing'. Thus, modern democratic theory and practice emphasises the connection of transparency (or visibility) and accountability. It is through the performance of public spectacle that political facts are created, and it is the causal relation between political agent and political fact that allows the agent to be held to account.

Scientific culture ascribes an important role to its audiences. Rather than looking on with the 'celebratory gaze' encouraged by the performance of distant and wonderful authority found in the Stuart Court and Roman Catholic Church during the seventeenth century, the audience is required to witness events with a critical 'attestive gaze'. 'Seeing' is only 'believing' when the attestive gaze of reliable witnesses are united.

Thus, corporations have turned to the notion of transparency as a means of establishing their legitimacy. In doing so, the companies are framing a public audience as able to hold the corporation to account on the basis of the information they learn about the company through its manifestation of transparency. However, as will be explored further in Chapter 5, transparency is not a straightforward characteristic, it requires a particular choreography of institutions, actors, technologies and spaces. In a recent paper, Brown and Michael (2002) argue that audiences of institutional transparency must trust the representations that are produced in order to accept them as indicators of transparency. Therefore greater transparency is unlikely

to provide a simple solution to the loss of public trust. They note in their study of controversy over zenotransplantation technology that there is a shift from a repertoire of transparency to one of emotional authenticity as a means of achieving accountability:

> Such transparency is constestable and thus needs to be performed persuasively if it is to be accepted. Our suggestion is that such transparency entails a movement from authority to 'authenticity', and in particular, authenticity signified by suffering, pain, agony and the like. That is to say, social conventions that structure the performance of suffering and pain are drawn upon by policy makers in order to help establish openness and transparency in the determination of risks: this discursive and practical repertoire of feelings, emotions and affect serves to signal authenticity or genuineness which in turn serves to establish transparency and openness.
>
> (Brown and Michael, 2002: 260-1)

This discussion of accountability suggests that once the agbiotech corporations engage in initiatives to represent themselves as socially responsible they become embroiled in complex processes of liberal democratic governance. The emphasis of the companies' concerns then shifts from public attitudes to biotechnology, to public attitudes to corporate governance. The agbiotech companies have started to respond to calls for greater public participation – through 'dialogue' – and greater public accountability – through 'transparency'. It is through these corporate initiatives that the concept of consumer-citizenship is taking shape. In the following section I explore ways to theorise these corporate institutional forms of accountability as being co-produced with configurations of consumer-citizenship.

Co-production of citizenship and the biotechnology sociotechnical ensemble

So far I have shown that work in the social sciences has discussed the relations of technology and citizenship as categories that act one upon the other. Focusing on the emergence of particular kinds of citizenship in corporate responses to GM controversies opens up the complexities of natural, social and political risks posed by GM foods. The corporate responses that I investigate in subsequent chapters can be understood as depending upon, and developing, the concept of consumer-citizenship and thus its corollary, corporate social responsibility. In doing this I am drawing

attention to a 'citizenship project' in the making, one that is occurring at the same time as biotechnological innovation. Here I turn to a strand of work in science and technology studies that focuses on the practices which co-produce scientific and social order. I argue that this approach can be used to study the co-production of forms of citizenship with the biotechnology sociotechnical ensemble. I understand corporate initiatives to achieve public legitimacy for their biotechnology innovation as integral to the seamless sociotechnical web that constitutes GM foods as a technical and commercial project.

Latour, in his monograph *We Have Never Been Modern* (1993), identifies the co-production of 'nature' and 'society' as the distinguishing characteristic of modernity. According to Latour, this co-production is achieved through twin processes of the proliferation of hybrid networks and their subsequent sorting out into the separate categories of 'nature' and 'society'. To emphasise the significance of this separation, or purification, Latour refers to "the two constitutional guarantees of the moderns – the universal laws of things, and the inalienable rights of subjects" (Latour, 1993: 50). It is the re-assessment of these guarantees in the light of contemporary controversies over science and technology that signals the constitutional moment discussed earlier. My concern here is to study the processes of co-production as a way of investigating constitutional dimensions of controversy over GM foods.

Jasanoff has developed the concept of co-production to draw out the relationship between the particular practices of knowledge making and normative questions of social order. Jasanoff attends to the processes of purification, by which the social and natural are sorted and the implications of these particular arrangements for formal political institutions.[10] In keeping with Latour's approach to studying the processes by which the modern categories of nature and society are constructed, Jasanoff uses the term co-production to focus on the processes by which ways of knowing about the world relate to the possible ways of living in the world: "co-production is symmetrical in that it calls attention to the social dimensions of cognitive commitments and understandings while at the same time underscoring the epistemic and material correlates of social formations" (Jasanoff, 2004b: 3).

[10] See Jasanoff's work on science advice to the US Government (1990) and science in the US law courts (1995b).

In effect, what Jasanoff achieves by developing the term co-production in this way is to open up a space for science and technology studies to engage with political questions not only about the politics of knowledge production, but also about the way that particular modes of knowledge have political consequences. This develops a link between an analytical focus on processes of knowledge production and their political context and consequences:

> To political scientists, particularly those working in post-structuralist frameworks, co-production offers new ways of thinking about power, highlighting the often invisible role of knowledges, expertise, technical practices and material objects in shaping, sustaining, subverting or transforming relations of authority.
>
> (Jasanoff, 2004b: 4)

Jasanoff's argument about co-production depends on an understanding of the modern state's dependence on science and technology as ways of knowing about the world and intervening in it. However, in this argument the term 'polity' is not restricted to the state. Her argument could equally call attention to the modes adopted by corporations as they institutionalise their relations with consumer-citizens:

> It is through systematic engagement with the natural world and the manufactured, physical environment that modern polities define and refine the meanings of citizenship and civic responsibility, the solidarities of nationhood and interest groups, the boundaries of the public and the private, the possibilities of freedom, and the necessity for control.
>
> (Jasanoff, 2004c: 14)

Jasanoff develops the observation that science and technology are intimately involved in the construction of the modern state to open the way for a normative analysis of science and technology. Echoing Winner (1987), Jasanoff calls attention to the processes by which political choices become settled through standardisation and stabilisation. However, rather than limiting the focus to technological systems, Jasanoff includes both social and natural orders in her frame of analysis:

> Important normative choices get made during the phase of emergence: in the resolution of conflicts; the classification of scientific and social objects; the standardization of technological practices; and the uptake of knowledge in different cultural contexts. Once the resulting settlements are normalized (social

> order) or naturalized (natural order), it becomes difficult to rediscover the contested assumptions that were freely in play before stability was effected.
>
> (Jasanoff, 2004d: 278-9)

An empirical study of co-production in action is provided by an account of the Human Genome Diversity Project (Reardon, 2001). Reardon recounts the failed efforts of scientists working on the Human Genome Diversity Project to establish the necessary global infrastructure to map the genetic diversity of human populations. The Project promised data that would be of great value to anthropologists studying human biological history; and to medical researchers working on genetic predispositions to disease. Reardon shows that the Project needed to establish both scientific definitions of human populations, and also social definitions of groups who could be identified, and whose permission could be sought to participate in the trial. The processes of co-production took place in the context of already charged historical processes:

> In science, Diversity Project organizers encountered persistent debates – ranging from 18th century taxonomy to 20th century population genetics – about order and variation in the biological world... In society, the Project evoked deeply entrenched questions about difference and identity. What is the unit of difference? Individuals or groups? If groups, who and/or what processes determine how to define these groups, and who can legitimately speak for them?
>
> (Reardon, 2001: 359)

The Human Genome Diversity Project attempted to resolve the question of social order by adapting the medical ethical instrument of 'informed consent' to work for social groups. This strategy failed due to the differences between the boundaries of the 'social' groups defined by the process of informed group consent and the boundaries of the 'natural' groups defined by the scientific goals of the Project. Failure also stemmed from the intense controversy sparked by the Project's echoes of colonial exploitation. This argues that processes of co-production make use of existing techniques and instruments, but the study also shows that these processes may fail in adapting these existing resources to the intended ends.

Another body of work that can be read as contributing to the co-productionist approach is that of Wynne. The co-production of risk assessment and social identity is at the core of his classic study of sheep farmers in Cumbria coping with UK

Government regulation of radioactivity after the Chernobyl disaster of 1987 (Wynne 1992). Wynne argues that the scientific risk assessments of the radioactive waste constructed a social identity for the farmers which they themselves did not recognise. This led to a sense of alienation on the part of the farmers, and regulatory practice that did not take account of the lived realities of hill farming. Wynne's study contributes to the argument that citizenship must be understood as including rights to being recognised as knowledgeable. This point has also been made by Visvanathan: "the citizen must be seen as a scientist, a person of knowledge not merely as a consumer and voter" (Visvanathan, 2002: 91).

The recognition of the citizen as a person of knowledge necessarily complicates the picture of co-production. Although there are specific sites at which co-production takes place, these products become meaningful in the context of wider circulation of knowledges and actors. In other words, an institution can co-produce forms of citizenship with technologies, but the fate of these productions is not determined at that site. The citizens who inhabit the social roles of citizen may take a different view, and walk away from the particular construction of their identity.

This theme is also reflected in recent work in which Wynne has developed his argument about the construction of citizenship identities. He examines current risk regulation at UK, EU and global levels that has increasingly attempted to include publics as ethical decision-makers (2001) and as active citizens (2002). However, Wynne argues that both institutionalisations construct public deliberation as separate from the process of technical innovation and decision making. In these institutionalisations of public engagement, public concerns are interpreted as epistemically vacuous. Scientific knowledge retains its dominant role in risk assessment, and is used to frame the issues for citizen or ethical deliberations, which are understood as utilitarian choices between scientifically defined outcomes. Public ethical concerns about GM foods, in this sense, are: "defined as purely private individual choices that can be freely made (with labelling) and fully resolved in the market place" (Wynne, 2001: 71-2).

Wynne's argument is relevant to my analysis of corporate co-productions of consumer-citizenship and the biotechnology sociotechnical ensemble as it points to

the ways that new forms of citizenship may re-inscribe dominant institutional tropes. The following discussion of work which use the concept of biopower to explore new modes of citizenship also notes the way that local negotiations of subjectivity and technological form can be scripted by wider discourses.

Biological Citizenship: technological regimes of the self

There is a body of work concerned with the ways that understandings and practices of biotechnology are constituting forms of subjectivity. These scholars are concerned with the material and discursive possibilities created by science and technology, and how these are involved in the processes of constituting personhood. These approaches share a particular focus on the techniques of biological sciences to shape the social identities, material realities and political possibilities of individuals in contemporary societies (Rabinow, 1999; Petryna, 2002; Rose and Novas, 2003; Heath *et al.* 2004). I argue that this work can be understood as sharing a concern with the co-production of citizenship and technology.

Novas and Rose (2000) explore how new techniques for genetic testing in combination with entrepreneurial uses of internet communication are producing potential for new forms of social identification. Using the example of Huntington's Disease, a late onset neurodegenerative genetic disorder, Novas and Rose discuss how people cope when genetic tests show that they are at risk of developing the disease. People 'at risk' and their families are using internet webforums to construct narratives about the responsibilities and management of genetic illness. These narrative constructions produce new identities and possibilities which define 'genetic' personhood. Whereas critics argue that genetic tests pave the way for discrimination through genetic determinism, Novas and Rose point to new possibilities that are being created:

> Genetic forms of thought have become intertwined within ethical problematizations of how to conduct one's life, formulate objectives and plan for the future in relation to genetic risk. In these life strategies, genetic forms of personhood make productive alliances and combinations with forms of selfhood that construct the subject as autonomous, prudent, responsible and self-actualizing.
> (Novas and Rose, 2000: 507)

The notion of genetic technologies and the practices used to make sense of them is developed by Rose and Novas (2003) in a discussion of 'biological citizenship'. They refer to Foucault's notion of biopower, a theory of the way that biological sciences are implicated in disciplining subjects through the production of biological categories. Rose and Novas focus in particular on the ways that biopower works to make up 'citizenship' as a way of making persons amenable to governing authorities:

> [W]e use the term 'biological citizenship' descriptively, to encompass all those citizenship projects that have linked their conceptions of citizens to beliefs about the biological existence of human beings, as individuals, as families and lineages, as communities, as population and races, and as species.
>
> (Rose and Novas 2003: 1)

Rose and Novas stress that the development of the science and technology of genetics has created new potentials for understanding the individual person as responsible for their own genetic welfare. This possibility is presented through the advent of genetic testing and research that identifies the genetic components of diseases. The new biological citizenship is forged in a context where neo-liberal regimes of economic activity emphasise enterprise and the entrepreneur. Another important context is the growth of the internet as a means of communication. Biological citizenship entails an active self-identification and learning through support groups and the internet. These internet forums provide a resource for reading and writing narratives of the self as 'at risk', 'ill' and 'coping'. Rose and Novas understand these dynamics of self identification as part of the 'political economy of hope':

> [C]ontemporary biological citizenship operates within what we term a 'political economy of hope'. Biology is no longer blind destiny, or even foreseen but implacable fate. It is knowable, mutable, improvable, eminently manipulable. Of course, the other side of hope is undoubtedly anxiety, fear even dread at what one's biological future, or that of those one cares for, might hold.
>
> (Rose and Novas 2003: 5-6)

Rabinow has referred to the working out of the relations between individuals, biological knowledge and techniques, and institutions in terms of 'purgatorial space' (1999). This space is a heterogeneous zone where national identity, state institutions, venture capital, academic research, biotech companies, and patient groups collectively engage in contemporary workings out of biopower. Heath *et al.* provide rich examples

from the US context of what they term 'genetic citizenship' (2004). They begin from a similar starting point to Rose and Novas, as they are concerned with new possibilities for identification of personhood through suffering and rare genetic disorders. They follow the communities formed via the medium of the internet and the ways that the promise of bioscience research is implicated in the emergence of new social identities. However, Heath *et al.* focus on the construction of a public sphere through the intersection of new social movements, genetic vulnerabilities and possibilities, formal institutions of national politics, and the US capitalist economy and its institutions of intellectual property regimes.

The approaches to studying biological or genetic citizenship that I have introduced differ in the extent to which they characterise contemporary phenomena as novel and particularly situated. Consequently they present differing conceptions of the relations between biological citizenship and other processes of citizenship. What they share is a concern with the ways that new approaches in biological sciences are producing knowledge and techniques that configure the apparently 'social' category of citizenship.

This section on the co-production of consumer-citizenship maintains that the concept of citizenship, which is central to liberal democratic modes of governance, is being transformed in the context of new accommodations between science and society. I have argued that scientific controversies, such as those over GM foods, represent a constitutional crisis. This crisis involves the challenging of established configurations of citizenship. However, this section has argued that new productions of citizenship depend on existing conceptions, which were formed in the context of the nation state. Re-workings of citizenship in debates about technological and environmental governance demonstrate the vivacity of the concept of citizenship. This is demonstrated again as corporations struggling to cope with a crisis of public trust in scientific institutions turn to existing democratic discourses. Across diverse arenas in contemporary societies, institutions are adopting forms of public participation and accountability as a means of re-establishing their authority. Corporations have adopted discourses of 'dialogue' as a form of public participation in corporate governance, and 'transparency' as a means of achieving greater corporate accountability. In doing so they are establishing the institutional arrangements in

which citizenship rights can be exercised. I argue that these moves can be understood as co-productions of citizenship with these legitimating institutions.

When studying the engagement of corporations with public controversy over GM foods this thesis uses the idiom of co-production to focus on the mutual construction of social categories, such as 'citizen' and 'corporation', with technological categories such 'GM foods' and 'herbicide tolerant crops'. Crucial to the argument of this thesis is the observation that, during the period my research is concerned with, innovation in plant biotechnology has been greater in the social, political and economic spheres than at the level of plant DNA. Between the latter half of the 1990s and the first few years of the 2000s only two GM crop traits were grown commercially: herbicide tolerance and insect resistance (James, 2003).[11] During the same period the industry had gone through dramatic restructuring, governments have been developing new modes of regulating GM crops, and food companies and retailers have been adjusting their policies on labelling and sourcing GM ingredients. The following section builds up an approach to the corporation as a site at which this co-production takes place.

2.3 Understanding corporations as sites for ordering technology and citizenship

This section turns to consider the particular character of the multinational corporation as the site for the co-production of 'consumer-citizenship' and 'socially acceptable agricultural biotechnology'. As I have argued in Chapter 1, a small number of large corporations are important sites for the development of agricultural biotechnology. The six major agbiotech companies and the other multinational corporations concerned with the commercialisation of GM foods are sites where biotechnological ensembles are being constructed. These corporations are using a combination of techniques to engineer plants at a genetic level; to create markets for their products; and to win regulatory approval for their activities. As I have argued in Chapter 1, now, these corporations are also having to consider 'the public' as an actor in their technology strategies.

[11] Crops are also grown which combine, or 'stack', these two traits.

This section reviews approaches from the social sciences to conceptualising the corporation as an organisation which can reflect and engage strategically with the contexts in which it operates. To do this, I address three overlapping questions. First, how do corporations become involved in the regulation and provision of wider public and private goods? Second, in what ways can a corporation be considered an actor with coherent and stable strategies? Third, what are the processes and techniques used by the corporations themselves to understand and engage with their markets and wider publics?

The corporation is an organisation that is held together by a catalogue of social and technical ties, including: legal and financial instruments, informal social networks, buildings, communication systems, traditions, relationships with customers and suppliers, intellectual property, documents and persons. Yet corporations are also continuously subjected to a range of centrifugal forces. In the following discussion I explore approaches from agro-food studies to studying how companies are involved in the production of public and private goods through networked relations with other companies and state actors. This approach emphasises the material constitutions of these relations and the political economic contexts in which they operate.

I then turn to consider how to theorise the firm as an actor. The concept of corporate culture has been developed in economic geography in a way that is compatible with post-structuralist approaches to the co-production of knowledge and social orders. One approach which I review here views the corporation as a field of competing discourses that can produce a corporate culture in which the company becomes a knowledgeable actor. Again this approach combines attention to the discursive and material embodiments of a particular cultural form so, for example, the new cultural economy characterised by the 'dot com' boom is understood as constituted by performances of dynamic entrepreneurialism by its managers.

I then consider how recent developments in science and technology studies have contributed to understandings of how markets are constructed, and how companies act within markets to frame their relations with consumers through a complex process of recording, measuring and inscribing interactions with consumers. Finally, I address how these approaches to understanding corporations can be applied to understanding

the corporate co-productions of citizenship and biotechnologies that are important in considering the commercialisation of GM foods.

Regulating production and consumption: approaches from agro-food studies

Agro-food studies is a heterogeneous field that has a strong tradition within geography. Over the last two decades agro-food studies has addressed a wide range of topics including agricultural change and rural livelihoods, ecological limits of industrial agriculture, globalisation of food provisioning, food retailing and consumption, food scares and food safety, and alternative food networks supplying organic and fair-trade foods (Goodman and Redclift, 1991; Watts and Goodman, 1997; Murdoch and Miele, 1999; Marsden *et al.*, 2000; Murdoch *et al.*, 2000). As Watts and Goodman (1997) argue, the recent richness in the field of agro-food studies is due, in part, to the co-existence of theoretical concerns stemming from political economic approaches to capital accumulation and commodity chains; and post-structuralist analysis of the meanings and identities which emerge through agro-food networks. Agro-food studies has also always been concerned with processes that crossover the divide between nature and society, so in this regard it shares interests with the co-productionist approaches to social and natural order introduced in the previous section.

Agro-food studies has generated significant insights into the spatially contingent, socially and materially embedded economic relations of food production and consumption. According to this approach, food economies do not result from systematic relations between pre-existing entities with coherent interests. Instead, the identity of firms, farms, governments and consumers are understood as fluid, emerging through their interactions. In this regard agro-food studies has shared in the wider turn to conceptualise economic relations in terms of networks (Murdoch, 1997). Recent agro-food studies have increasingly emphasised alternative food networks, this interest in part reflects the changing commercial and political priorities of the food-rich global North, and in part results from an intellectual concern with extending analysis beyond the categories of political economics to include the material cultures which connect processes of production and consumption. For example, work has

explored the ways in which new meanings of food as 'organic' or 'fairly-traded' are being constructed (see respectively Murdoch *et al.*, 2000 and Whatmore and Thorne, 1997).

Closely related to the study of food quality as a re-embedding of food in local and organic relations of production are a group of studies that have focused on the regulation of food safety and quality by the large UK retailers (Marsden and Wrigley, 1995; Harrison *et al.*, 1997; Marsden *et al.*, 1998; Flynn *et al.*, 1999; Marsden *et al.*, 2000). These authors start from a broad understanding of 'regulation' – taking the term to encompass all coordination of economic activity to produce both public and private goods. The central argument of these studies is that in the UK the respective roles of the state and retailers in coordinating the production and consumption of food cannot be thought of separately as public interest and private interest regulation. Rather, both the state and retailers collaborate in constructing and regulating the agro-food system.

In the case of food and agriculture there are many aspects which governments promote as public goods such as the provision of enough safe food, promoting the population's health through encouraging the consumption of a more healthy national diet, ensuring the livelihood of rural communities and employment in the food industry, and promoting ecological diversity. If regulation to meet these ends is considered 'public interest' regulation, then the coordinating activities of capital geared to accumulating profits is considered 'private interest' regulation. In the case of the regulation of food quality in the UK after the food scares of the late 1980s, the corporate retail sector and the government have collaborated in the regulation of newly defined 'rights to consume'. In the UK, the rights of citizens as consumers are guaranteed through the provision of food choices by the large food retailers.[12]

The concerns in this section with the role of corporations as a site at which new forms of citizenship are being invoked is illustrated by this study of food retailers in the UK. The relations between the state and the food retailers shifted during the 1990s. The

[12] The state is, of course, deeply involved in establishing the conditions under which food retailers are able to offer food choices to UK citizen-consumers, for example through the planning process. This takes account of 'food deserts' which occur when (usually working-class) people are excluded from the food provisioning system by the retailers' locational strategies (Marsden, *et al*, 2000: 33-40).

role of the UK government changed from regulating food safety to providing a baseline guarantee of food safety which is exceeded by the larger retailers as they seek to produce competitive advantages through the provision of food that meets their own, branded, standards of quality. Thus, a more differentiated food quality regulatory system has emerged. Smaller retailers are held to state administered baseline standards policed by local government Environmental Health Officers and Trading Standards Officers. Larger retailers that have the economic power and managerial resources to police their own supply chains, define and regulate their own quality standards. For the large retailers the government's role shifts from policing the standards to auditing the corporate management procedures (Marsden *et al.*, 2000).

The distinctions between 'public' and 'private' goods are not clear-cut in the context of food quality standards. It is possible to see the regulatory role of corporate retailers as operating *both* in their own private interest *and* in the wider public interest. The large retailers in the UK have used their ability to coordinate standards applied by their suppliers to guarantee food safety to consumers and the British state. The consequence is that retailers have managed to achieve high levels of public confidence in the food system:

> The corporate retailers were not assuming a role that government would otherwise have undertaken, because government continued to play an active role. Rather, by going beyond the state baseline, the major retailers have been able to formulate and impose their own food quality standards. In doing so they have performed a public interest role and one that may have partially relieved government of its regulatory role. This is because the major retailers are such (increasingly) dominant locations for food purchasing that their activities on food standards have highly significant implications for the quality of food that is purchased. Thus by pursuing their own private interest of market maintenance, the major retailers have also performed a public interest role in relation to food standards. They have also for the most part proved much more able to assuage public fears over the safety of food than government.
>
> (Flynn *et al.* 1999: 445)

In the wake of public controversy over the introduction of GM soya into the global food chain in 1996, it was retailers and food producers who were forced by activist campaigns to announce policies not to include GM ingredients in their products during 1997 to 1999. The success of the NGO campaigns, which included a 'disloyalty' card launched by Greenpeace targeting Unilever's GM-containing

products, can be seen as a consequence of the trend towards private-interest regulation of the food system. The retailers and food producers were vulnerable to consumer activism which threatened public trust in their brands' guarantees of food safety.

Marsden *et al.* (2000) argue that rather than trying to explain the regulation of food quality as either in the public *or* private interest, what is happening is the reframing of 'public interests' as 'consumer interests'. The increasing scale and power of food retailers requires them to defend their dominance in the face of criticism that the concentration of retail power lies in the hands of a small number of corporations. One way they achieve this is to represent the new state/retailer regulation of food quality as socially progressive: "The growing provision of 'food choice', and the elaboration of different degrees and definitions of quality, feed this progressive ideology both inside and outside government circles." (Marsden *et al.*, 1998: 492).

In order to maintain the socially progressive tenor of the economic and political power of corporate retail, the public interest is being redefined through the lens of consumer interest. It is in the capacity of custodian of consumers' rights that food retailers have become the 'consumers' champion' with respect to the introduction of irradiated foods and genetically modified foods, resisting their introduction in the face of the UK government approval of these technologies. These cases provide a good illustration of the respective power of retailers and the government to define 'consumer interest'. Marsden *et al.* (1998) found that government officials accepted the legitimacy of retailers' representations of consumer interest, on the basis of the retailers' commercial ability to attract consumers through their doors:

> In interviews with government officials it was clear that the material fact that millions of people pass through the main retailers every day gave the corporate retailers an authority in Whitehall which far outweighed the representations of consumer organisations or public bodies. The retailers' pivotal position as consumer gateways, as social barometers, and particularly their considerable intelligence-gathering activities about consumers, becomes a powerful representational tool in their dealings with the state.
>
> (Marsden *et al.*, 1998: 491)

These case studies of how corporate retailers in the UK have negotiated their relations with consumers and the state over issues of food safety illustrate the ways the

corporations become enmeshed in political processes of representing public interests. In the case of controversy over GM foods, the agbiotech companies were confronted with the complexity of having to engage in framing public interests in biotechnology. All six of the agbiotech companies were originally chemical (and/or pharmaceutical) companies, that have not had the degree of contact with end consumers that retailers and consumer goods companies have developed. The agbiotech companies had not been prepared for the demands of a newly vocal public interest in the companies' technology strategies. They have been forced to develop methods to cope with these new demands, and have begun to engage with public interests through a variety of initiatives to build corporate relations with their wider publics. In addition to considering citizen-rights to consume, these companies have begun to confront citizen-like demands to participate in the technological innovation of quasi-sovereign corporations.

A concern with consumer-citizen demands to participate in corporate governance raises questions about how the corporation is understood. In this context it is insufficient to understand the corporation as a neo-classical economic actor rationally maximising profits. The very question of how to conceptualise the corporation is at stake in consumer-citizen demands; for example, what actions is the corporation accountable for? In order to analyse the corporation as an actor whose identity is at the same time emerging from interactions with other actors implies an understanding of 'the corporation' as a contingent social achievement. The next section explores theoretical approaches in economic geography that allow the corporation to be understood both as a discursive construction, and as a powerful political economic actor.

Ordering the corporation: cultures and discourses of management

The agbiotech companies found themselves having to cope with public tensions that they had not foreseen. Their management of global public relations and their integration of these public interests with the companies' innovation strategies challenged the very identity of the corporations. As Chapter 1 has illustrated, the period between 1996 and 2003 saw the merger of AstaZeneca and Novartis to form

Syngenta, Monsanto bought by another company then relaunched, and Aventis Cropscience sold to Bayer. In all these transactions the 'public acceptance' of biotechnology was a central issue, either because in retrospect it can be seen as taken for granted, and then because the uncertainties that attended it impacted on the stock market valuations of the agbiotech companies. In order to properly understand the ways that these corporations have grappled with questions of public attitudes to GM foods it is important to reconsider the category of the corporation. How does it become a site for the production of knowledge about the publics it frames through its commercial activities? And how do corporations become entangled in political wrangles about the questions of private and public interest?

Work in economic geography provides a useful framework for studying the role of corporations in coordinating innovation and production. Economic geography is a sub-discipline of geography that pays attention to the spatial processes implicated in economic activities. These processes include the location of production, consumption and exchange, and the relationship between the particular sites of these economic activities and particular spatial forms such as cities and regions. Conversely, economic geography is also concerned with how the historic, physical, and cultural specificities of the spaces in which economic activity takes place influence the forms and trajectories of economic units such as the economy, industry and the firm (Clark *et al.*, 2000; Sheppard and Barnes, 2000; and also Lee and Wills, 1997). Economic geography has experienced vigorous debates during the last decade as it has recognised the social embeddedness of economic action; paid greater attention to processes of exchange and consumption; and included a consideration of the context in which economic activity takes place (Thrift and Olds, 1996).

This 'cultural turn' in economic geography has called into question the identities of economic actors. Consideration of the social embeddedness of economic activity led to questions about how to conceptualise the firm as a fundamental unit of economic activity. Recent work in economic geography has problematised the firm as a stable and coherent entity.[13] For example, Taylor and Asheim (2001) argue that rather than regarding the firm as "a formative element in an economic system" (2001: 315) the

[13] See the special issue of the journal *Economic* Geography (2001, 77 (4)), and also Yeung (2001).

significance of firms as produced by, and performing, spatial relations warrants more concerted theoretical attention. In their review they introduce a wide range of conceptualisations of the firm, which they divide into two groups: 'rationalist perspectives on the firm', and 'the firm in socioeconomics'. The rationalist perspective covers neoclassical theory of the firm as a profit maximising entity described by its production functions. In contrast to this approach, Taylor and Asheim introduce the concept of the firm as the organisational embodiment of managerial discourse:

> This view of the firm is, in effect, a discourse of managerialism centred on information, knowledge, and "talk." In a disordered, fast-moving global environment, firms (principally large corporations) use their superior adaptability, flexibility, and tacit knowledge constantly to generate new representations of themselves by creating inclusive organisational cultures.
>
> (Taylor and Asheim, 2001: 323)

O'Neill is one of the proponents of conceptualising corporations as fields of competing discourses. He argues that this approach allows for economic geography to study the complexity of large corporations (O'Neill, 2003). In particular, O'Neill draws attention to the ways that different corporate discourses are constructed, stabilised and interact. This opens up an approach to studying how decision-making occurs within firms:

> [W]ays of seeing the large corporation as having different logics of composition (different to production/distribution logics) are in their infancy. For instance, how do we systematically get to know the corporation as a site for the creation of shareholder value-added; for the generation and transfer of knowledge; and as multiple sites of power-laden contests over intra-corporate distributional flows? A corporation that is more complex in composition and scope presents major challenges in defining what the corporation actually is, and in collecting data to represent its changed nature and operation.
>
> (O'Neill, 2003: 678)

Corporate engagements in controversy over GM foods provide a useful testing ground to explore the ways that competing discourses about the corporation interact. In the case of agbiotech companies, the goals of innovation strategy and the companies' relations with their publics are now subject to public debate. According to the companies' own understanding of this public debate, a central question is the status of

the corporation as trustworthy and responsive to public concerns about GM foods. Therefore, corporate performances of their own coherence as institutional actors are a crucial element of their response to public controversy.

An approach which picks up on the way that corporations are constantly re-performing themselves is advanced by Gibson-Graham (2000). She focuses on how analysts can focus on the contested and partial coherence of corporate actors by studying the way that corporate discourses are organised in practice. The vitality and vigour that are taken as requirements for corporate success inhere in the firm's ability to act within changing discursive fields. As Gibson-Graham (2000) point out, these approaches to studying the identity and agency of the firm are inspired by post-structuralist study of language. The representation of a firm as a coherent legal entity and nexus of capital accumulation can be deconstructed as the telling of one particular narrative, whose elements also allow for alternative readings. Gibson-Graham argues that this approach can be used strategically to de-centre the corporation or the monolithic concept of capitalism with its deterministic logics of accumulation.

Conceptualising corporations as fields of discourse opens up a possible approach for the investigation of how biotech corporations are engaging in current controversies over GM foods by representing themselves as responsible custodians of the public interest. This approach is illustrated by two studies of the 'discursive firm' which concentrate on the role of discourses of resource allocation in constructing the identity and agency of the Australian mining company, BHP (Broken Hill Proprietary) Ltd. By studying executive talk and its relation to 'enterprise discourse' O'Neill and Gibson-Graham (1999) demonstrate the fractured identity of BHP. O'Neill (2001) studies how two competing discourses of financial management shaped decision-making at BHP during the 1990s.

O'Neill and Gibson-Graham (1999) analyse interviews with two executives at BHP concerning the companies' oldest steelworks, in Newcastle, New South Wales. The two executives give accounts of investment, organisation and restructuring at BHP during the 1980s that refer to enterprise discourses that were current within BHP. Stories of the chequered history of the Newcastle steelworks told by the two executives tended to emphasise both the reasonableness and inevitability of their

decisions given the prevailing conditions. The interviewees constructed the coherence and rationality of each moment in the episodes they recounted by reference to different enterprise discourses. In their analysis, O'Neill and Gibson-Graham highlight the inconsistencies within and between these accounts, and the discourses in which they appear rational, by juxtaposing contradictory passages. They do this in order to show that there is not one enterprise discourse structuring decision-making within the firm, but several. The authors use this observation to make their point that an open analysis of corporate decision-making culture can point to political opportunities to engage in the governance of corporations:

> Our objective is to highlight the performative nature of enterprise discourse and to intersect the discourse-talk-action relationship by representing the firm as being susceptible to an open-ended variety of political strategies emerging from both within and without its corporate boundaries.
>
> (O'Neill and Gibson-Graham, 1999: 12)

The potential political implications of adopting a conceptualisation of the corporation as a field of discursive struggle are explicit in the work of O'Neill and Gibson-Graham. They reject the view of the firm adopted in financial management literature as an "intersection for many 'stakeholders' competing internally and externally for investment." (O'Neill and Gibson-Graham, 1999: 13). Instead, they look towards a more radical opening up of questions about what and who a corporation exists for:

> We are interested in opening up a conversation about what a corporation is, who is entitled to intervene in what it does, and what claims upon its resources can be made by whom and for what, in order to invigorate a new politics of the firm... Our purpose in representing the enterprise as disorganised, incoherent and contradictory is to undermine the disciplining power of a single and unidirectional logic of reproduction. When the reproductive logic of the corporation is dislodged, processes that were previously positioned as external to that logic are free to impose on corporate practice.
>
> (O'Neill and Gibson-Graham, 1999: 20)

The concept of the 'discursive firm' has also been elaborated by Schoenberger (1997).[14] One of the central themes in Schoenberger's book *The Cultural Crisis of the Firm* is the explanation of industrial rigidity in US firms during the period from the

[14] See also McDowell (1997) for the gendering of corporate culture.

1970s when Fordist modes of production were challenged by reconfigurations of international trade. Schoenberger uses her analysis of academic reflection on the sources of rigidity, along with case studies of Lockheed and Xerox, to develop a theory of corporate culture. This theory of corporate culture is concerned with the discursive authority of senior managers to construct the corporation through the reproduction of a corporate culture which Schoenberger argues "embraces material practices, social relations, and ways of thinking. Culture both produces these things and is a product of them in a complicated and highly contested historical process." (1997: 120).

Schoenberger uses this theory of corporate culture to develop an approach to understanding corporate power in a US context. She argues that corporate power is located in its ability to create markets through shaping needs and tastes; and in its capacity to institutionalise models of competition and production. The consequences of these forms of power are that management in dominant firms are able to "stabilize their environments, allowing for the rational management and reproduction of their social and material assets over time" (1997: 125). Corporate cultures, Schoenberger argues, are made up of material and social practices which construct social order. This order has consequences for how value is measured and apportioned within the firm. For example, Fordist cultures of industrial production classify labour as an undifferentiated cost, the reduction of which increases profits. Corporate culture can also order who is included or excluded from the corporation's imagination. Relations with competitors, suppliers, and new markets are all structured by corporate culture. Scheonberger illustrates her argument with examples of failures of US firms run along Fordist lines to respond to changing political economic contexts. The management of these companies viewed workers as a cost to be reduced, rather than as individual participants in the production process. They also failed to recognise Japanese firms as potential competitors during the 1960s.

Schoenberger's approach to corporate culture emphasises the standardising tendencies of managerial control. In an ethnography of a high energy physics laboratory in northern England Law (1994) is also concerned with the production of material and social orders; however his approach is particularly sensitive to the tentative nature of organisational culture. Law's approach is particularly helpful in conceptualising the

complex responses of the agbiotech corporations to controversy. It highlights the role played by material artefacts and techniques in the constitution of an organisation.

Law develops what he calls a 'modest sociology' of the ordering of social and material resources, which together make up the laboratory.[15] Rather than trying to define the organisation of Daresbury Laboratory and map it on to a coherent model of social order, Law is concerned with the specific instances of ordering and the localised 'pools of order' which are thus established. As Law does not take these pools of order to be given, but rather an achievement of heterogeneous actors, including the ethnographer; the methodological approach he adopts is geared toward studying the processes by which order is produced. The localised orders thus produced are made up of heterogeneous networks of materials, social relations, humans, and technologies. In common with much work in human geography and science and technology studies, the process of ordering is understood as an emergent property of these heterogeneous networks.

The focus of Law's interest is in the material and social processes of ordering, however both his methodological and theoretical concerns assume that some modes of ordering are more durable than others. Some modes of ordering extend over wider scales of space and time and may entail greater distributions of resources and greater concentrations of agency at organisational centres. It is these managerialist modes of ordering that most interest Law in his study of the Daresbury Laboratory. Law is also concerned with the ways that such managerial modes of ordering empower actors at their centre and entail a consequent deletion of agency from others.

Law's use of 'modes of ordering' as an organising analytical category leans heavily on Foucault's elaboration of the concept of 'discourse'. The elements of Foucault's theoretical treatment of discourse that Law has adopted include an attention to the materiality of arrangements of knowledge and power. He is also concerned with the ways these arrangements constitute possibilities of life, labour and language; and in particular the sense that discourses are "forms of strategic arranging that are intentional but do not necessarily have a subject" (Law, 1994: 21). However, Law

[15] Law identifies the character of his modest sociology as: symmetrical, non-reductionist, recursive, process oriented and reflexive. See Law (1994: 9-18).

argues that Foucault's use of semiotic approaches to the study of modernity leads to a synchronic and totalising concept of discourse. This leads, according to Law, to an empirical approach that leaves the reader with the sensation of looking at a series of snapshots as Foucault "turns the page of the photo-album" (Law, 1994: 106). Law's answer is to allow for many discourses to co-exist and to re-introduce stories that tell of their emergence:

> My proposal is that we take the notion of discourse and cut it down to size. This means: first, we should treat it as a set of patterns that might be imputed to the networks of the social; second, we should look for discourses in the plural, not discourse in the singular; third, we should treat discourses as order*ing* attempts, not orders; fourth, we should explore how they are performed, embodied and told in different materials; and fifth, we should consider the ways in which they interact, change, or indeed face extinction.
>
> (Law, 1994: 95, emphasis in original)

Law describes four modes of ordering which "embody and perform particular patterns of relations" (1994: 110) at the Laboratory. Law relates how these four modes emerge during the course of his conversations with people at the Laboratory, conversations which often seem to have been concerned with histories of Daresbury. 'Enterprise' is the name given by Law to a mode of ordering that celebrates the opportunistic entrepreneur, who is able to respond pragmatically to dynamic circumstances. In contrast, the 'administration' mode tends towards routines and careful attention to rules and hierarchies. Two more modes, 'vision' and 'vocation' concern alternatives modes of embodying the role of the scientist at the Laboratory.

'Enterprise' is the mode that privileges heroic entrepreneurs who are able to define objectives for the organisation and bend the rules in the process of achieving those objectives. In this mode, according to Law, there is an emphasis on the polished performance of organisational vigour. In the process of emphasising the consumption of these performances of enterprise, for example, visitors to Daresbury "drive a moral wedge between backstage and frontstage" (1994: 167). What is front stage is treated with suspicion by the enrolled audience of enterprise; and what is found backstage is accorded the status of 'real'. Thus, what Law calls a 'theatre of distrust' is produced. Law provides a script to illustrate a distrustful visit;

> 'Look how impressively I perform.'
> 'But you perform to impress me. So your performance is an artifice. What does it hide? What *really* lies behind smooth talk, the pastel shades, and the tinted glass?'
> 'But come backstage and have a look. You'll see that my performance isn't *really* an artifice.'
> 'How nice. But you're *still* performing. What are you hiding? What *really* lies behind the smooth talk...?'
>
> (Law, 1994: 170, original emphasis)

Law's study of Daresbury's modes of ordering focuses on the relationally material construction of social order. This approach augments theories in economic geography of the discursive firm. For example, Law's ethnographic approach identifies the elements that combine to produce the authority of the manager. These include both narratives of entrepreneurialism and also the material means of reproducing and distributing texts representing the will of the manager. Such means include the Laboratory's computers, notice boards, and meetings.

I have so far argued that controversy over GM foods has forced corporations with a stake in their commercialisation to innovate new techniques for including consideration of the public interest in their technology strategies. I have gone on to suggest that these sites of corporate innovation are reconfiguring consumer-citizen rights with respect to the corporate governance of biotechnology. I have argued that corporations are constructed through particular management discourses and practices, and that Law's approach to studying modes of ordering can be used to explore the discursive and material production of corporate cultures. Using this approach I study the innovation by agbiotech corporations of new institutional forms of engagement with consumer-citizens.

The attention of my argument is focused on specific cases of corporate innovation of institutional forms of public engagement. However, these are taking place in the context of a wider culture that extends beyond the individual firm. Nigel Thrift has advanced an argument that shows how the performance of a coherent company takes place within a wider enterprise culture. The value of his approach for my argument is that he introduces the significance of the specific spaces in which these performances of management occur. His series of studies of internet start-up companies in the 'new economy' straddles the moment when the bubble of booming stock market valuations

burst in early 2000 (Thrift, 2000; 2001). His studies are not located in any one company but explore the cultures of the economy which supported these start-ups. In his discussion of what is left after the stock market bust, Thrift focuses on the relationships among rhetorical, material and performative constructions of the new economy. Business magazines, management consultants, government policy makers and managers became authors and audiences for a construction of the new economy as dynamic, adaptable, youthful, creative and high-tech. This set up what Thrift has referred to as a 'cultural circuit of capital' which together with government policy makers, academic economists, managers, and the information and communication technology itself, made up five stakeholders that pushed forward the dynamic culture of the new economy. Together they frame the new economy:

> The push provided by these five stakeholders set up a frame of action and expectation, a new set of market rules and commensurabilities. Just as importantly, the institution of the frame also depended upon a vision of what was outside it. In this case, it was the 'old economy' of heavy industry, bureaucratic ways, a deficit of entrepreneurial spirit and general lack of economic sparkle.
>
> (Thrift, 2001: 418)

Thrift goes beyond the analysis of textual and visual representations of the new economy to study its material, embodied and performative dimensions. Managers' bodies took forms commensurate with the youthful and dynamic style of the economy's culture. Thrift describes the dominant form of these bodies as mobile, adaptable, passionate, and participative. This performance was expensive, and required substantial investment to produce the spaces for the cultural circuit of capital, and the embodied performances of the new economy's managers. Resources were provided through the active involvement of the financial industry in the construction of the new economy. For the performance of this new economy, the financial industry itself provided some of the key innovations in the form of venture capital funds, initial public offerings, and employee stock options:

> This financial interpretation, therefore, produced a frame around the frame of the new economy; the new economy became a command performance whose script (aided by extravagant props and acting) played so well to financial audiences that they were willing to pay the ever-increasing costs of admission. In other words, the new economy became a theatre which could be used both to push share prices up and to extend share ownership.
>
> (Thrift, 2001: 423)

Thrift explores further the emergence of new management subjectivities in the context of the new economy by attending to the production of spaces in which the creative and youthful management subject intersects with the new economy (2000). Thrift points to three spaces in particular where subjectivities of new management culture are performed: visual representations of speed and high-tech communication in business magazines; embodied performance of creativity and participative engagement, illustrated by training workshops in which role-playing is the principle mode of enacting participation; and locations of mobility and interactivity such as those established by open-plan office architecture in which workers do not have a fixed home, but work on the move. Thrift's argument emphasises the relationships between the embodied practices of corporate culture, and the spaces in which these performances occur.

This review of approaches to studying the firm in economic geography highlights the processes of constructing corporate culture. This view treats the firm as the construct of competing discourses and highlights the contested and fluid identity of the corporation. Work in economic geography also argues that corporate culture can be understood as powerfully ordering the social and material relations of the firm. Law provides a methodologically grounded approach to studying the construction of an organisation. He draws attention to the material and narrative modes of ordering organisational resources. Finally, Thrift's approach points to the embodied and performative dimensions of the wider cultures in which corporations take shape. In exploring the corporation as a site at which citizenship and new institutional forms are co-produced the above approaches can be combined with an analysis of corporate practices that engage with the world 'outside'. Such an approach is explored in the following section.

Framing markets and scripting consumers

At the heart of the challenge to the corporate culture of the agbiotech corporations is the emergence of public attitudes to GM foods which the companies had not foreseen, and to which they did not know how to respond. As is described in Chapter 1, the corporations had not imagined that the European public would figure as such a

powerful actor in shaping the governance of GM technology. So far this section has charted how companies are part of wider networks of the governance of food, and how corporate culture can be understood as being made up from conflicting management discourses. In both cases the corporate constructions of the public plays a role, first, in the ability of UK retailers to represent consumer interests to the government, and secondly in the role that corporate culture plays in imagining consumers in relation to the operation of the company. The particular question of how corporations understand and relate to their publics can be addressed in more detail by reference to approaches in science and technology studies.

Callon (1998) has argued that science and technology studies can contribute to the study of economic activity by focusing on the processes involved in constructing markets. Callon calls attention to the work that is required to frame a particular situation in order that the relevant actors can calculate the consequences of their interaction. According to this understanding of the operation of the market, economic decision-making occurs when a frame is established that allows the identification of the relevant actors, their actions and a measure of the consequence of these actions. To illustrate the framing of market interactions, Callon refers to the physical and social construction of a particular market for strawberries in the Sologne region of France, such that the buyers and sellers can clearly see at any moment in time the quality and quantity of each batch of strawberries, who has supplied them, and who is buying them.

Callon argues that as the entanglements of science, technology and society become increasingly complex, it becomes harder to successfully frame interactions among a clearly defined group of actors. The negative externalities of environmental pollution illustrate Callon's argument. As it becomes harder to reach consensus on the causes and effects of pollution it is harder to completely frame market transactions. Callon refers to these as 'hot situations' in which framing fails due to the proliferation of uncertainty over the identity of the relevant actors and the effects of their actions. Once the market framing has broken down a 'hybrid forum' takes shape in its place, which is defined by the disruption of the distinction between facts and values in a given problem:

> [F]acts and values have become entangled to such an extent that it is no longer possible to distinguish between two successive stages: first, the production and dissemination of information or knowledge, and second, the decision-making process itself.
>
> (Callon, 1998: 260)

The concept of 'hybrid forum' as described by Callon is an example of a wider recognition that knowledge-making is inevitably entangled with its application and use in decision-making contexts (see for example Jasanoff, 1990 and 1995).[16] For corporations making decisions about research and development, the framing required to calculate the consequences of different options has to make assumptions about actors' future behaviour. To do this they develop models of consumer behaviour, for example, as part of Unilever's extensive food product development there is a standard protocol by which consumer panels are established to test consumer reactions to the food's taste, texture, colour and other properties. The company's techniques for modelling consumer behaviour, using experiments that record and codify such knowledge, translate the range of possible actions of a diverse range of actors as 'consumer behaviour'. In this form it is commensurable with corporate decision-making about the development of new products.

Callon has also written about the processes by which two service companies operating in Paris engage in measuring, writing down and referring to records of their commercial performance (2002). These texts help the companies to coordinate their activities by providing scripts which describe the product they are selling, the tasks of people working for the company, and the behaviour of their consumers. In one of the examples, Callon investigates the case of a company which runs boat cruises on the Seine. The company frames its consumers through a process of recording and analysing consumer attitudes and preferences (Callon, 2002).

Callon argues that the company's consumers are constructed through the process of inscribing their preferences, which are configured by the statistical models and sampling techniques used, and the format of the customer satisfaction questionnaires and focus groups. However, these categories of consumers are constantly being tested

[16] Nowonty *et al* (2001) are also concerned with the production of knowledge in the context of its application, they introduce the term *agora* to describe a "new public space where science and society, the market and politics, co-mingle" (2001: 203).

through the services which the company provides, and so these constructions of the consumer are real in that they are stable enough categories for the company to operate and innovate new services. Thus Callon describes the work of the company as an experiment which is constantly testing and adjusting its models of a consuming public. In Callon's terms, the company and the consumer are co-authors of the text which performs demand for the Seine cruises:

> Customers' expectations only become clear in the collaborative process of writing and rewriting. It is only at the end – when customers' satisfaction is measured – that firm and customer discover the precise nature of supply and demand. Consumers are "grasped" by a writing device in a process of *joint elaboration*, which generates demand.
>
> (Callon, 2002: 209, emphasis in original)

Consumers are not always as cooperative in their co-authorship of supply and demand. An organisation's ability to predict and manage interactions with their publics may be limited, as described in the case of film-making at the BBC (Davies, 1998) and exhibition design at the UK Science Museum (Macdonald, 2002). This unmanageability of consumers is particularly acute when the products they are asked to consume are novel. The agbiotech companies confronted this challenge when they encountered public campaigns against the introduction of GM foods in Europe which sought to advance competing constructions of consumer interests and consumer attitudes.

The agbiotech corporations have had to reframe their relations with external publics with respect to biotechnology. Since 1999 it has become apparent to these companies that they must extend their framing of the public beyond that of the consumer of end-products, or citizen whose public interests are upheld by the regulatory system. The companies have found themselves in a 'hot situation' where the externalities of public concern have overflowed into the established modes of corporate ordering. They have begun to develop new modes of framing the citizen-like concerns of consumers. This interest in how processes of framing become implicated in the relations between social order and technological order is shared by work that develops a political analysis of Callon's theory of framing.

Barry has developed a series of arguments concerned with the extension of technological zones through which artefacts can circulate, by such means as intellectual property rights, regulatory protocols, and industry standards (Barry, 2001). Barry's discussion raises questions of the ways that political expressions are framed in relation to these technological zones. In these terms the concept of 'technological citizenship' implies norms of citizen participation in making technological judgements. Barry defines a technological society as one preoccupied by the exercise of technological judgements:

> [I]n speaking of a technological society I want to interrogate a quite specific contemporary preoccupation. This is a political preoccupation with the problems technology poses, with the potential benefits it promises, and with the models of social and political order it seems to make available. We live in a technological society, I argue, to the extent that specific technologies dominate our sense of the kinds of problems that governments and politics must address, and the solutions that we must adopt.
>
> (Barry, 2001: 2)

The corporate innovations of new modes of framing their relations with consumer-citizens over questions of GM technology can be understood as instances of a technological society in operation. Barry develops his theory of technological society by reference to Callon's discussion of the means by which market exchanges are brought into being. Callon argues that the ability of agents to calculate the consequences of their interaction, which is the basis of the operation of a market, depends on the construction of a frame around their encounter. That frame fixes the wider context so that it can be discounted for the purpose of the market transaction (Callon 1998). Callon goes on to discuss the paradox that the act of framing, which isolates the situation of market exchange, necessarily depends on its connection to a wider network of calculation that takes account of the externalities. In situations where externalities are hard to calculate, then framing is difficult to achieve.

In a recent paper, Barry takes issue with the implication in Callon's work that when a situation is successfully framed it is no longer political:

> Calculation is thought to reduce the space of the political and to limit the possibility for disagreement. When situations become calculable it is taken to indicate the fact that political contestation has ended.
>
> (Barry, 2002: 272)

Barry agrees with Callon that the apparatus required to establish the possibility of calculation does act as an anti-political device to the extent that it succeeds in reducing the space for controversy. However, such regimes of calculation also entail new possibilities for political dissent and debate. This happens due to both their fragility – which opens up possibilities for the process of calculation itself becoming controversial – and due to their inventiveness, as new objects and sites are produced which can themselves become the focus of political action. Barry illustrates the fragility of metrological regimes with the example of a system set up to measure road pollution in a borough of London. The difficulty of establishing a secure relationship between the measurement, the vehicle and overall air quality experienced by local residents meant that the regime was open to challenges (Barry, 2001: chapter 7). The inventiveness of metrological regimes is illustrated by investigation into the Hatfield rail crash of 2000. Investigators identified cracks in the rail due to metal fatigue as the cause of the accident. Cracks in the rail and the problems of measuring and managing them then became the focus of a major political debate in the UK (Barry, 2002: 277-279).

Corporations have responded to public controversy over GM foods by innovating new modes of framing their interactions with 'the public'. These can be understood as consisting of techniques to identify, represent and translate public concerns so as to make them commensurable with the companies' managerial discourses. To the extent that these modes of framing succeed in cooling controversy over GM foods they can be understood as achieving anti-political ends. However, Barry's work draws attentions to the unintended political consequences of the 'anti-political economy'. As corporations turn to narratives and techniques from democratic governance as a means of containing public unease and re-establish corporate legitimacy, they are producing new spaces and objects for political contestation.

2.4 Performing the technological public sphere

In this section I develop the concept of the performance of corporate culture as a way of studying the co-production of new corporate engagements with the public and new forms of citizenship. In section 2.2, I discussed the ways that citizenship is emerging as an important category in technological controversies. In section 2.3, I explored approaches to studying the corporation as an agent in the production of regulatory regimes, and as an organisation produced through discursive and material practices. In this section I propose an approach to studying the co-production of particular forms of citizenship with corporate institutional innovations designed in response to the GM controversy. To do this I develop an analytical term that draws on the previous discussion of Law's study of the production of organisational order, and Callon's discussion of the formation of markets. I then use this term to understand the ways that corporations stage performances of themselves in the context of public controversy.

So far I have proposed that corporations can be understood as the achievement of what Law terms 'modes of ordering' (1994). In order to further understand the processes by which these corporations engage in constructing the conditions of interactions with external publics I have turned to Callon's use of the term 'framing' (1998). In this chapter I propose combining these two approaches to analyse the co-production of particular corporate institutions at the same time as configuring their relations with citizens. I argue that these 'modes of framing' simultaneously produce a form of the corporation and a form of citizenship. I understand this term to refer to the ways that the corporation's relations with its publics are produced through the organisation of institutional arrangements that make such interaction possible. The term points to the inextricable links between the internal organisation and external relations. By combining an interest with the organisation forms and external relations this theoretical approach means that I do not have to start by assuming what is internal and what external to the company, but rather how this boundary is produced.

I use 'modes of framing' as an analytical device to study the performance of corporations in the context of the GM controversy. I will argue in the following chapters that these performances are structured and maintained through different

patterns of material and discursive practice. I identify these different patterns as alternative modes of framing, each of which performs a particular version of the corporation in relation to a particular configuration of the consumer-citizen. To further develop this approach to institutional performance I turn to Hilgartner's study of the production of scientific reports by the US National Academy of Sciences on diet and health (2000). Hilgartner draws on metaphors of drama and staging to explore ways that the National Academy has constructed representations of itself and its advice in the context of public controversy. His attention to the National Academy's performance of itself as an authoritative source of scientific advice pays attention to the narrative and spatial arrangements of bodies, institutions and objects in the staging of interaction between the Academy and its publics. These narratives concern the ways in which the Academy assesses conflicting scientific advice to come up with credible advice that represent a scientific consensus. This is done by producing a spatial arrangement of a secluded backstage in which experts can disagree and debate as they weigh up the evidence, and a public front stage where they present their findings.

In drawing attention to the ways that the culture of science is used to legitimate the findings of the National Academy of Sciences reports, Hilgartner develops Goffman's (1959) concept of 'region behaviour'. Social actors, through the management of information about themselves, construct a 'front stage' open to public view, and a 'backstage', which, although vital to the performance of social interaction, is shielded from the audience. Hilgartner underlines the implications of taking a dramaturgical approach to studying the selective self-revelation and concealment which the National Academy uses to project the character of a knowledgeable and trustworthy authority on diet and health. The identity of the Academy and its relations with its publics are the result of their interactions, which the Academy itself tries to stage-manage as much as possible. The language of theatre used by Hilgartner to describe the self-presentation of the Academy does not imply that the Academy's performance is disingenuous, to be contrasted with an unmediated and artless 'reality'. Rather, Hilgartner assumes that the performative quality of social interaction is fundamental to the reality of society and its institutions.

Hilgartner focuses on the Academy's production of scientific advisory reports as the means by which it represents itself. These texts are thus performances, which use the stagecraft of information control to present the characters, and narrative devices to give meaning to their actions. This form of self-presentation by the Academy also constructs the audiences with which it engages:

> The Academy's system of stage management is thus not merely a mechanism to regulate the flow of information but also a means of structuring the relations between experts and publics – or more deeply, of *constituting* performers and audiences with particular capabilities (and enforced inabilities) of speech and perception.
>
> (Hilgartner, 2000: 147)

In the context of public controversy in the USA over the findings of the National Academy reports, the credibility of the Academy's procedures were questioned by the reports critics. Hilgartner argues that the Academy had constructed its backstage by policing access to the processes of negotiation amongst contributors to the report through confidentiality arrangements. At the same time, the credibility of the scientific process of evaluating the evidence depended on the representation of the Academy as an objective space of critical reflection. This is achieved by the Academy through carefully choreographed revelations of the 'behind the scenes' workings of report writing. Equally, critics engaged in undermining the authority of the reports by questioning the fairness of the procedure used by the Academy to evaluate scientific evidence and to agree on the wording of a report. As Hilgartner puts it, the Academy strategically presents itself and its work practices through a "dialectic of revelation and concealment" (2001: 60). I return to this concept in subsequent chapters when discussing the public presentation of the companies.

The agbiotech corporations have responded to the crisis in public legitimacy in their role as innovators of biotechnology by attempting to reframe their relations with consumer-citizens. The companies have developed modes of framing that employ overlapping narrative devices which stage the corporations' identity and relations with their publics. Through texts produced by the corporation, such as websites, brochures and advertisements, the corporations attempt to present themselves as trustworthy innovators of biotechnology. This approach provides a means for understanding

corporate framing of its relations with 'consumer-citizens' as a performance of accountability. Accountability is not a stable state, rather it is a process of interactions among principals, agents and intermediaries. Accountability therefore requires the coming together of actors and devices to record and translate the views of principals and the actions of the agent. Borrowing from terminology developed by symbolic interactionist sociologists, accountability can be understood as the outcome of a performance, in which the consumer-citizens and corporations interact on the set of carefully crafted stage.

My interest in corporate engagements with public controversy over GM foods focuses attention on particular kinds of performance. The corporate modes of framing that I am concerned with are ones that perform the 'socially responsible corporation' and its relations with 'consumer-citizens'. To do this, modes of framing bring together narratives about the role of corporations and their publics with techniques and expertise which frame relations between these actors. Such performances are moments in a cycle of continuous self-presentation by corporations. It is through such performances that the identity of the corporation becomes stabilised. These performances are located at multiple stages, which include the texts which companies produce to represent themselves to their many audiences. These audiences include shareholder, financial analysts, journalists, local communities, regulatory authorities, employees, customers, competitors and NGOs, to name but a few. The ability of companies to construct and manage such stages accounts for their success as dynamic and innovative organisations. In the final section I discuss how these theoretical concerns can be addressed through empirical research.

2.5 Studying corporate modes of framing the consumer-citizen

In this chapter I have argued that in the context of contemporary debates about global governance of technological risks, the concept of citizenship has renewed salience. I have reviewed various approaches to conceptualising citizenship, and I have argued that controversy over GM foods is an intriguing case in which citizenship rights and identities are called into question. I have used the idiom of co-production as an approach to understanding the relationship between debates about citizenship rights

and the shaping of GM technologies. However, as I have argued, in the case of GM foods, the most striking innovation during the last decade has not been in the diversity or specificity of new strains of crop plant, but in the mechanisms that the agbiotech companies have developed to cope with unexpected public controversy over the commercialisation of GM crops.

The site at which I trace the co-production of citizenships and technologies is the novel corporate engagements with wider publics. In the cases I examine, the citizenships produced are hybrids of consumer and citizen identities, which can be termed consumer-citizens. The technologies are those that produce the accountable, or socially responsible corporation as a legitimate innovator of GM technologies. Work in economic geography provides the theoretical tools to study the corporation as constituted by competing discourses, which construct corporate cultures that structure the firm's internal and external relations. Law's attention to organisational modes of ordering provides a bridge between economic geographies of the corporation and the idiom of co-production.

My empirical approach to studying corporate modes of framing the consumer-citizen is developed from Hilgartner's study of performances of the US National Academy of Sciences. Following Hilgartner, I study the multiple forms of corporate self-representation as performing these modes of framing. Instances of the performance of the corporation include my interviews with individuals from the companies, corporate websites, corporate brochures and press releases, corporate public relations campaigns, presentations and seminars. From this diverse collection of texts I trace corporate performances in the context of the global public controversy over GM foods.

Using the theoretical approaches and insights discussed in this chapter I go on to address a series of four research questions.

1. How have those corporations with a stake in the commercialisation of agricultural biotechnology understood and responded to global public controversy over GM foods?

2. How have these corporations framed relations with their publics in the light of controversy over GM foods?
    - What techniques have they employed in these framings?
    - What expertise have they called on?
    - What spaces of interaction are created by these framings?

3. How is the corporation and its publics performed?
    - What narratives structure these performances?
    - What roles are played by the consumer-citizen?
    - What roles are played by the socially responsible corporation?

4. What are the political implications of these corporate performances for the constitutional struggles over science and society?
- In what ways do they constitute new forms of citizenship rights?
- What new spaces have been produced for public engagement in the governance of corporate innovation?

In order to address the above questions I will apply the relational, co-productionist approach discussed in this chapter. This stance emphasises the situated performance of the corporation and its relations with consumer-citizens. However, it retains an interest in the ways that these momentary performances become stabilised and politically significant within wider discourses of democratic governance of technology. To retain a sensitivity to the contextualised performance of the corporation and its publics, and at the same time to engage with the constitutional implications of these moments, requires a careful methodological approach. The strategy I have developed for answering these research questions is discussed in the following chapter.

Chapter 3

Researching corporations: a discussion of journeys, methodology and methods

3.1 Introduction

In this chapter I respond to a series of methodological issues that are raised by the research questions at the end of Chapter 2. These research questions explore how corporate responses to the GM controversy can be understood as performances which stage the relations between the firm and its publics. I am concerned in this thesis with the different modes of framing these corporate performances. Through close empirical engagement with multiple moments of corporate self-performance I investigate how these modes of framing employ narratives, expertise and techniques that co-produce forms of 'consumer-citizenship' and 'socially responsible corporations'.

I address my place as a researcher in relation to this process of co-production through a discussion of the methodological approach I have adopted. I argue that my encounters with different sites and moments of corporate self-presentation constitute themselves part of the performative relations of 'the corporation' with its 'outside'. I develop in this chapter the interpretive approach I use to relate my specific encounters with the field of corporate public self-presentation to wider modes of framing, which are organising corporate relations with their publics. This concern with co-production through institutional performance resonates with recent discussions in cultural geography about the ways qualitative research methods are responding to the challenge of understanding "both the fieldwork and field worker as socially constructed" (Crang, 2003: 494).

I have been engaged with the field of GM controversies, in the UK and USA, from the summer of 2000 until the end of 2003. Since I began this research I have been

following three companies and two public relations bodies through different moments in their engagement with public controversy over GM foods. I have attended conferences, interviewed participants, visited websites, requested company reports, signed-up to electronic newsletters, read newspapers, watched television advertisements, and I have exchanged emails and telephone conversations with people working in the companies I am studying. In all these exchanges I have been collecting and producing texts. These texts represent a 'public' face of a strange and unwieldy social actor – the multinational corporation. In this chapter, I argue that these texts can be treated as performing the corporation, both its internal processes and external relations.

The methodological questions that this approach raises are currently recognised as important concerns in cultural geography, and other interpretative social science. As Mike Crang has argued, an appreciation of the "(co-)construction of the field by the researcher and researched" challenges established treatments of representations in the social sciences (Crang, 2003: 494). According to Crang, accepting this constructionist agenda implies that methodologies need to pay greater attention to the position of the researcher in the processes of producing meanings. This, he argues, places greater emphasis on the embodiment of subject positions and leads to a greater methodological concern with performativity. In this chapter I am concerned with understanding the complexity that characterises the interplay between textual representations and performativity at two levels. First, I understand corporations as performing themselves through textual representations in brochures, on websites and through interactions with other institutions. Second, I discuss how my textual representations recorded during fieldwork and presented in this thesis are themselves part of a wider process of performing relations between corporations and their publics.

In the following section I give an account of how my research questions emerged from my initial forays into the world of corporate research on GM foods. In section 3.3 I discuss how corporations have been studied in science and technology studies and geography; I then explain how I selected the specific companies whose performances are the focus of this thesis. In section 3.4 I discuss methodological approaches that I use in studying performances of the corporation. The cases I look at provide examples of how to treat the interplay between research encounters in 'the

field', organisational productions of texts and the performance of corporations. In section 3.5 I explain in more detail my approach to studying corporate performances of themselves. I discuss the sites I have selected for study and the methods I have used. Section 3.6 concludes this chapter with a brief description of how I have used my methodological approach to structure the following three chapters, each of which explores a different mode of framing corporate performances in the context of controversy over GM foods.

3.2 My methodological journey

In this section I explore the non-linear process of my engagement with interdisciplinary research and the field that led to the formulation of my research questions discussed in Chapter 2. My PhD was configured as interdisciplinary from the beginning. As a student in the Environment & Society Research Unit of UCL's Department of Geography I have been embedded in a research institution committed to carrying out interdisciplinary research in partnership with voluntary, public and private organisations. This research tradition has emphasised interactions between academics and their research partners, who were often also both the subjects and clients of the research. This approach to 'action research' has produced research in areas of environmental and health policy (Burgess *et al.*, 1998; 2003; Chilvers *et al.*, 2003; Clark *et al.*, 2001). In addition, I have had a secondary home in UCL's Department of Science & Technology Studies. Thus my PhD has been structured around the engagement between geography and science and technology studies. My experience before starting research for this PhD has also contributed to the interdisciplinary and interactive approach; my undergraduate degree was in chemistry and I had spent a year working as a research chemist in a pharmaceutical company and a further year working for Unilever.

The story of my engagement with the field of corporate responses to public controversy over GM foods begins with a conference on the global governance of agricultural biotechnology at Harvard University. Not, I should point out, the same conference that I described at the start of Chapter 1, which highlighted the thematic concerns of this thesis. This conference took place in September 2000, soon after I

arrived in the USA for a year's study at Harvard University's Kennedy School of Government. The title of the conference was "Biotechnology in the Global Economy: Science and the Precautionary Principle".[17] The conference as a whole was critical of what was often referred to as the 'vagueness' of the precautionary principle, and the costs of its implementation in the domain of agricultural biotechnology. In particular, speakers pointed to the precautionary principle as a disincentive to innovation, world trade, and agricultural development in the global South.

The conference was well attended by people from the agbiotech companies. I was eager to make contacts with people who might be able to help me gain access to companies for my PhD research. During the two days of the conference I met Roger Krueger from Monsanto, whose business card told me he was "Roger W. Krueger, PhD. Director, Environmental/Stewardship & Global Product Development". I also met Tom Gaskin from DuPont, according to his card "Manager, Biotechnology Regulatory Affairs & Policy Development".

I found that I got on well with Gaskin, and I explained to him that I was interested in studying the strategy of agbiotech companies in the light of the European controversy over GM foods. He said that he would agree to help me talk to people at DuPont. After the conference we exchanged emails and he set up four interviews with scientists and managers at DuPont's "Agricultural Enterprise". At this stage I was planning to carry out a detailed study of a GM research project. My idea was to trace the techniques that the company was using to research public attitudes to GM foods, and then to follow how these corporate understandings of public attitudes were used in the development of new research projects. My approach was influenced by Wiebe Bijker's study of sociotechnical change (1995), which suggested that innovators would try and resolve objections to a particular technology by redesigning the artefact.

Through my email conversations with Gaskin I knew that DuPont was working on genetically modifying soya to increase its proportion of 'healthy' oils. This GM crop was called High Oleic Soy, because it was modified to be high in oleic fatty acid.

[17] The conference was organised by Calestous Juma, who had been the secretary to the Cartagena Protocol negotiations, before moving to the Kennedy School's Center for International Development.

Processed foods that used this GM soya would be lower in 'bad' trans-fats, and therefore, so the argument ran, more attractive to the consumer.[18] This seemed to me a perfect example of a model of consumer attitudes applied to biotechnology research. One of the dominant arguments that the agbiotech industry used to explain consumer 'resistance' to GM foods was in terms of an informal personal risk assessment. The argument goes: 'Consumers perceive that there are some possible risks associated with GM foods, but no benefits to them. Therefore they play safe and opt for conventional foods instead.'

In accordance with this argument a second wave of GM crops were under development. Rather than the so-called 'input' traits, like herbicide tolerance and insect resistance, which benefited (some) farmers, these crops would have 'output' traits, which would made them more nutritious for the consumer. DuPont's soy research product seemed to provide a good example of this new generation of GM crops. The agbiotech industry's logic was that this would not only overcome consumer resistance to GM crops by changing their personal risk calculations, but also add economic value to the consumer product, some of which can be claimed by the company owning the patent to the modified gene. It seemed to me that this would be a great study in which to explore the assumptions about 'the consumer' with which companies were developing their research strategy. It would also allow me to examine the techniques they used to determine what consumer attitudes were, and how these were incorporated in the design of the GM technology. However, this plan of mine ran aground.[19]

There were two major problems with this research plan, both of which raised methodological issues which I have since engaged with. The first was that I had imagined that DuPont, the corporation, was a coherent actor whose research strategy was rationally devised and that this strategy accurately represented the research that

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[18] Soya oil normally contains a higher proportion of polyunsaturated fatty acids, which need to be hydrogenated for use in foods resulting in 'trans' fats, which are considered to present a serious health risk. Oleic fatty acids, by contrast, are monounsaturated so do not require hydrogenation (Kinney and Knowlton, 1998).

[19] Although DuPont had received regulatory approval for its High Oleic Soy in the USA it did not have approval in the EU or Japan because it contained antibiotic resistance marker genes. As the market for processed soya is global, DuPont decided not to market this product until it had won approval outside the USA (Garber, 2000).

was carried out in practice. The second was that the kind of questions I was asking were highly commercially sensitive, both because of the competitive nature of the market in which DuPont operates, and also because of the company's understandable wariness about issues connected with public controversy over GM foods. However, the way in which this plan broke down led me to the research presented in this thesis.

I was very excited about following up the possibility of researching the story of DuPont's High Oleic Soy. My focus would be on how DuPont constructed notions of 'nutritional benefit to the consumer' – through consumer research, through scientific evidence of health risk/benefits, through working with government agencies and NGOs to establish new profiles for 'bad' fats, etc. However, having followed up my first visit with a proposal for further research on these issues I received an email from Suzy Devereux, Communications Manager for DuPont Nutrition & Health, telling me that I would not be able to continue my research as it was too commercially sensitive. With hindsight this is not at all surprising, but I was disappointed nonetheless as I had got on well with Tom Gaskin and the scientist that I had already interviewed. After several emails I finally arranged to travel back to Wilmington, Delaware to meet with both Suzy Devereux and Tom Gaskin.

Suzy, I learned, was a big fan of London. She had worked previously as press officer for the men's professional tennis tour – and apparently had fond memories of 'managing' John McEnroe's relations with the British press. After she made it clear to me that I would not receive any co-operation with research on High Oleic Soya we discussed other possible avenues of research. One that seemed interesting was to study DuPont's marketing of soymilk as a health food. This topic would have allowed me to explore the internal changes underway at DuPont as it developed its new interest in food markets, which was quite a change from DuPont's established strategy of producing high value materials for sale to industry. The study of soymilk would also allow me to research the role that DuPont played in the FDA rule change allowing foods to display the health claim:

"Twenty-five grams of soy protein a day, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease."

On my return to Boston I decided that despite the fact that this proposal was taking me away from the original direction of my research I would agree to Devereux's proposal. I thought that the project would offer a good way 'in' to the company, and that it need not define the limits of my PhD research. In other words, I thought that I had nothing to lose so I might as well see how far the soymilk story would take me. After a while I received an email from Devereux:

> Rob, pls. forgive me for getting back to you so late! My sincerest apologies... This is a crazy time, as you can imagine...
>
> I have good news for you, if you are still interested...our DuPont Protein Technologies group is interested in working on a case study with you on the soy protein development of the FDA claim, then branding concept, Solae(tm) and 8th Continent. They would like more information on how the case would be used, i.e. at the business school, for publication only, etc. etc.
>
> Please advise at your earliest convenience.
> Many thanks and warm regards,
>
> Suzy

Less than one hour later the next email arrived:

> Rob, apologies...just saw a note from my boss asking if we could hold up on this for six months to a year...not the best timing right now...will you still be in school then???
>
> Suzy

I understood the second email as representing a dead-end for the soymilk plan. This caused me to rethink my approach to getting access to companies for my research interests. This was only one company, I could try a similar approach again with a different company. But it had taken me over a year to get this far with DuPont, so I

thought again about the kinds of research questions I wanted to ask. Having to revisit the research questions and their theoretical framing in the light of experience in the field is a widely recognised aspect of interpretative methodologies (Silverman, 1993). This recursive process of iteration between formulating research questions and experience of the empirical sites is shaped by the power relations that exist between the researcher and the corporate field. Here, the negotiation of access to study corporations can be used by 'gate keepers' to shape the research questions asked and the sites at which these are investigated (Parry, 1998).

I was struck by the irony that while I was struggling to get access to study agbiotech companies, the same companies were declaring their new commitments to openness and transparency. DuPont had led the way in the public commitments made by its CEO in September 1999: "I believe that the concerns of the public must be addressed openly, and I support whatever steps may be necessary to ensure that biotechnology, in all areas, is developed and used safely" (Holliday, 1999: 3).

Here, I thought, is an interesting set of research questions which side-step problems of negotiating privileged access to the agbiotech companies. If I studied the ways that these companies were practicing openness and transparency I could use my own efforts to learn about the companies' biotechnology strategy as an experiment in transparency. I could investigate public presentations of the corporations through texts disseminated publicly by the corporations, which I would then supplement by following these self-presentations through attending meetings and conferences at which people from the corporations were speaking and carrying out interviews with spokespeople from the companies. My adapted research questions and their implied research practice became an exploration in corporate boundaries constructed through engagements in the public sphere.

The route I followed to arrive at the research questions outlined at the end of Chapter 2 involved iterations through both academic literature discussed in Chapter 2 and my experience of the empirical field. This process has been both interdisciplinary and interactive, leading to a methodological approach concerned with the non-linear processes by which corporations are performed through the research context. In the following section I place my approach to studying the corporation in the context of

social science studies of corporations and the governance of biotechnology, and I then identify the companies that I selected for further research.

3.3 Studying 'the corporation'

During my discussions with different people at DuPont during 2000 and 2001 I was being presented with different representations of what was happening at the company. As I tried to negotiate access I was uncertain who had the authority to grant what degree of access. I had begun with a naïve idea that if only I could find the right person, I could hope to be granted access to study 'DuPont'. The contradictory messages I received brought me to an understanding of the ways that different people spoke with differing degrees of authority 'for' DuPont. These spokespersons were not just describing a separate entity; they themselves were constituting the company as they spoke. As I struggled to locate the firm I was trying to study I came to understand DuPont's 'spokespeople' to include the company's brochures, products, brands, websites, as well as the different people I was communicating with. But the term 'spokesperson' does not convey the constitutive role that these people, texts and artefacts were playing in making up the company. These spokespeople were not providing 'mere' representations of the firm, called 'DuPont', which existed at an identifiable time and place apart from the spokesperson's description. Rather, the 'DuPont' was continuously being re-constituted through the 'performance' of the corporation by its spokespeople.

Surprisingly, there has not been a great deal of work in science and technology studies that has focused on the firm as a site of knowledge production. A prominent exception is the anthropologist, Paul Rabinow's (1996) study of biotechnology research in a small company in California during the 1980s. Rabinow tells the story of the development and commercialisation of the polymerase chain reaction (PCR), a technique for amplifying DNA, upon which much of current biotechnology depends. His book, *Making PCR: A Story of Biotechnology*, is specifically concerned with the biotech 'start-up' company as an important site in the development of biotechnology during the 1980s. Rabinow was interested by how scientists in these companies

viewed their work in contrast to that taking place in Universities, and his study relies on interviews that tell the personal histories of people involved in the story of PCR.

There have also been two recent PhD theses that have paid serious attention to the role of companies in the trajectory of biotechnology developments. Shobita Parthasarathy has studied the company Myriad Genetics as it tried to commercialise tests for genetic predisposition to breast cancer in the USA and UK (Parthasarathy, 2003). Her comparative approach argues that the company's strategy and the technology itself were reconfigured in the different contexts of medical practice the USA and UK. Similarly, Sara Skodbo, whose thesis explores the Norwegian context for the commercialisation of food biotechnology, pays attention to the role of a dairy firm in shaping a specifically 'Norwegian' biotechnology (Skodbo, 2003). There have also been studies of the history of technology that have been interested in the rise of corporate research laboratories during the twentieth century. A seminal study has been carried out on the history of corporate science at DuPont, which identifies the company as one of the trail-blazers of centralised corporate research (Hounshell and Smith, 1988). The book uses research in the DuPont archives supplemented by interviews to argue that the structuring of corporate research has shaped the company and its products throughout the twentieth century. These studies are concerned with the specificities of corporations as sites at which knowledge is produced. They point to the mutual shaping of the company as an institutional form and the science and technology that is produced there.

The rather scant concern within science and technology studies for studying corporations as sites of knowledge production is contrasted by engagement with studies of the corporation in economic geography. As discussed in Chapter 2, there is a strong and lively tradition of corporate geography. These detailed empirical studies have explored the ways that different discourses of financial management shape corporate decision-making (O'Neill, 2001), and how corporate identities are produced through discursive, material and natural networks (O'Neill and Whatmore, 2000). Studies have also argued that corporate cultures shape the interactions between the company and its political economic context (Schoenberger, 1997), and also how wider economic cultures are performed through the material and discursive practices of the company (Thrift, 2001). As I have argued in Chapter 2, this thesis combines

approaches to knowledge production and corporations from science and technology studies and geography. These theoretical concerns are reflected in my selection of companies for my thesis research.

The empirical work of this thesis has been shaped by the companies I have studied - DuPont, Monsanto and Unilever.[20] I selected these companies because of their prominent engagements with public debates about GM foods. As I have explained in Chapter 1, there are currently only six multinational companies with a significant direct commercial interest in agricultural biotechnology: BASF, Bayer, Dow, DuPont, Monsanto, Syngenta. Of these six, it is Monsanto that has by far the largest agbiotech sales. In 2003 Monsanto had a 90 per cent share of the world's GM seed market (Monsanto, 2003b). Monsanto has also taken a prominent role in promoting GM technologies, and conversely, it has been the most visible target of campaigns against the commercialisation of GM crops. This makes Monsanto an obvious company to choose to study. Its prominence resulted in a large quantity of potential material for study, such as Monsanto's advertisements in Europe during 1998, and a large number of newspaper articles. Monsanto's public reversal of fortunes has also led to changes of strategy at the company which provide interesting material for this study.

DuPont has the largest share of the world's commercial seed market with seed sales of $2 billion, which accounts for about 9 per cent of the total (ETC, 2003). I chose to study DuPont for two reasons. First, I had already established contacts at the company during my preliminary research on DuPont's High Oleic Soy. Second, in September 1999 DuPont became the first agbiotech company to make a high-profile announcement that the way industry had pushed for the commercialisation of GM crops without regard for its critics was a mistake. DuPont's CEO committed his company to taking public concerns more seriously and to acknowledging the potential risks posed by biotechnology. He promised that from then on DuPont would be more open and transparent about its biotechnology strategy. A month later Monsanto's CEO, Robert Shapiro, made a similar announcement during his appearance by video-link at Greenpeace's business conference in London. Therefore DuPont's leading

[20] See Appendix B for a description of DuPont, Monsanto and Unilever.

position and the steps it has taken to meet its commitments make it an interesting company to study.

In some ways Unilever is a less obvious choice of company to study. Although it had been one of first large companies to invest in GM foods research in the early 1980s (Wright, 1994), it had by the late 1990s sold its agricultural interests and no longer had any significant research programme on GM foods.[21] However, as one of the world's largest food companies, it remains closely engaged in debates about GM foods, and has a direct commercial interest in the use of GM ingredients in its products. The two reasons I chose to study Unilever were similar to those behind my selection of DuPont. First, Unilever had sponsored social scientists at Lancaster University and at the University of Sussex to carry out research on aspects of the GM foods controversy (Grove-White *et al.*, 1997; 2000; Stirling and Mayer, 1999). These studies were interesting as contributions to scholarship on the governance of biotechnology, and also because they were commissioned by Unilever in collaboration with environmental and consumer interest NGOs in the UK. The second reason I chose to study Unilever was that I had worked at Unilever for a year, and although I did not work on issues related to GM foods, I wrote my MSc dissertation on Unilever's GM foods research (Doubleday, 1999).

In addition to studying DuPont, Monsanto and Unilever, this thesis is also based on research on two public relations bodies set up by the six agbiotech companies. The Council for Biotechnology Information (CBI) was launched in the USA and Canada in April 2000, and two years later the Agricultural Biotechnology Council (ABC) was launched in the UK. I was led to these organisations as they constituted one of the principal means by which Monsanto and DuPont were engaging with public controversy over GM foods. In the following section I discuss the methodological approaches I have drawn on in studying Monsanto, DuPont, Unilever, CBI and ABC.

[21] In 1998 Unilever sold its primary GM agricultural research interest, Plant Breeding International (PBI), to Monsanto, see Appendix B.

3.4 Methodological approaches to studying performances of the corporation

This section returns to consider the methodological questions raised by my research interest in corporate self-performances. The preceding sections have discussed my interactive and non-linear journey to the research questions listed in Chapter 2 and my particular approach to studying corporations. This section develops a methodological treatment of studying corporate texts as performing new forms of consumer-citizenship and corporate social responsibility. This concern with text and performance draws on work in science and technology studies that develops symbolic interactionist approaches to studying the production of meanings in the context of social interaction.

The methodological approach I develop in this section is designed to study the self-presentation of corporations through the production of texts and embodied representations of the company. Research in science and technology studies has questioned the methodological divide between texts as representations and the objects they represent. The dictum 'follow the actor' through whatever heterogeneous route it takes has also been used in cultural geography to explore the construction of institutions through the circulation of texts (Davies, 2000). In the case of this PhD, my methodological approach follows corporate performances through a variety of locations and media. I retain a particular focus on how these self-presentations produce the spaces for social interaction and also configure the actors involved in the performance. This concern with combining an interest in the materiality of interaction and the performance of social identity is shared with scholars working in science and technology studies who have turned to the sociological tradition of symbolic interactionism to analyse the interrelation of the sociotechnical worlds (Star, 1991). Both Law (1994), in his study of the Daresbury Laboratory, and Hilgartner (2000), in his study of the US National Academy of Sciences, have adopted approaches from symbolic interactionism.

In his book *The Craft of Inquiry*, Alford (1998) argues that symbolic interactionism has developed as an interpretive approach to studying the production and interpretation of meanings through the negotiation of social order. Alford summarises the methodological approaches implied by such an explicitly interpretivist approach:

> [I]nterpretive arguments focus on the theoretical importance of the symbolic construction of meanings in social interaction. Such meanings are inferred from observations of behaviour in natural situations, from interpretations of texts, and from depth interviews that interrogate individuals about the way in which they interpret their experiences and social relations. The observer is seen as a participant in the co-construction of meanings, not as a separate, isolated, neutral, and "objective" scientific analyst.
>
> (Alford, 1998: 85)

This short quotation summarises the methods that I argue can be combined to carry out a co-productionist study of corporate performances of themselves interacting with their publics. I now explore in more detail the three methods used in the research for this thesis: textual analysis, participant observation and in-depth interviews. I explain how this mixture of methods can be coherently combined in order to develop an analytical account. I discuss the implications for my analytical argument that flow from recognising that the subject position of the researcher is actively engaged in the co-construction of knowledge together with the actors being researched. This leads to a summary of the approach I have followed in analysing this qualitative material.

Returning to the quotation from Alford cited above, it states that "meanings are inferred from observations of behaviour in natural situations". This ethnographic stance does not suggest that the researcher can enter unmediated into another world to compile an objective account of its 'natural state'. Rather, what this stance points to is that meanings are produced in the context of interaction, therefore what is observed by the researcher is the production of meaning in that specific context. This ethnographic stance underpins the methodological approach I adopt in this thesis. In other words, I have undertaken an extended period of engagement with corporate self-presentations in the controversy over GM foods. The meaning of the material that I have collected during this period of research is produced in the specific context of the research encounter. Therefore, in my analysis of this material I have recreated elements of the context in which it was found.

The quotation from Alford (1998: 85) then goes on to refer to the "interpretations of texts". This element of Alford's description of an interpretivist methodology is crucial to my thesis research. The corporations I have studied have produced a large amount

of textual representations of themselves with respect to controversy over GM foods. These representations, such as corporate websites and brochures, are the principal means by which these companies are performing themselves as newly responsive to public concerns about biotechnology. As I have indicated above, I adopt a methodological approach that does not treat texts as categorically different from the material world that is represented in the text. To achieve this I have turned to work that considers texts as performing social and material relations.

Cultural geography has recently experienced a growth of interest in studying the performative, and non-representational dimensions of cultural formations (Crang, 2003; Nash, 2000). This turn to consider the embodied practices, and their non-verbal registers is sometimes contrasted to concerns with textual representations. Catherine Nash, in her review of the uses of concepts of performativity in cultural geography, introduces her paper by stating its interest in the "metaphorical and substantive turn from the 'text' and representations, to performance and practices" (Nash, 2000: 654). As both Nash and Crang argue, the development of a sensitivity towards the performative and affective qualities of interaction has opened up vast new areas of study, including sensual experience, visual cultures, emotions and bodily practices. A concern with the ways that interactions are performed opens up analysis to consider the material and embodied practices which make up experience, interactions and social orders. However, I want to argue that a methodological concern with the performance of social interaction is compatible with an interest in texts and languages.

Scholars working in science and technology studies have developed an interest in texts as material objects which themselves constitute a performance of ordering that natural and social world. A seminal study by Bruno Latour (1987) discusses the ways in which scientific texts operate as devices linking verbal claims to objects in a laboratory, and inscriptions represented as charts and tables. The same text may also link itself and its experimental objects with objects outside the laboratory. The text is meaningful because it constructs a context in which it is linked with other scientists and laboratories through the literary technology of citation (Latour, 1987). Such a text not only creates links, but it also orders the world it constructs. There are many diverse actors involved in supporting the claims of the text, however, the rhetorical structuring of the scientific article unambiguously identifies the 'authors' of the text.

Texts such as scientific articles are always material. Information circulates, links and orders in material forms. A number of scholars in science and technology studies have combined a concern with the materiality of texts and the claims they make with a concern for the social orders they produce. These authors have turned to the sociological tradition of symbolic interactionism to explore the ways in which systems of codifying knowledge perform particular social orders (Star, 1991; Law, 1994; Callon, 1998; Hilgartner, 2000).

Such an approach to the ways in which information circulates through its material embodiment is presented by Law and Hetherington (2000). They argue that information is produced by material arrangements that have spatial effects. The example they give is the expansion of the Portuguese empire in the sixteenth century. Distant locations were brought into relationship with Lisbon through an increasingly complex network of materials which produced information that was concentrated in the imperial capital. Ships were built and provisioned to travel and bring back news as well as traded goods. As more information was collected, new maps were drawn up, which in turn allowed Portugal to extend trading routes and collect more information. Thus Lisbon was performed as an imperial capital able to send commands round the globe due to the material arrangements that created asymmetric flows of information. A further example of the way that texts are implicated in the performance of social and natural order is provided by Star and Griesemer (1989). They describe the way that a Zoological Museum in Berkeley, California became an important centre for zoological collections through the labours of amateur naturalists. This relationship was performed by a standardised form that the museum gave to collectors, which disciplined their collecting habits and concentrated information about the collection in the hands of the museum curators.

These two examples illustrate ways in which texts can be understood as material elements in heterogeneous arrangements. The information carried by scientific articles, ships, maps and standardised forms performs social and natural orders through linking otherwise distant objects and subjects. This approach does not neglect the content of the information itself. The meaning of a text is produced through an interplay between the information it carries and the material form it takes. This

understanding of the jointly material and discursive character of texts is presented by John Law's study of modes of organising the Daresbury Laboratory (1994). This study was introduced in Chapter 2 in terms of the approach it develops for studying organisational processes of ordering. This section now considers the methodological implications of this study.

Law argues that the production of textual representations is integral to the performance of the Laboratory as a manageable organisation. This is achieved by the concentration of representations in a way that produces 'managers' at the centre of the organisation: "an ordering centre – a centre of translation – strains towards reflexivity and self-reflexivity. That is, it monitors what is going on, and acts on the basis of this monitoring" (Law: 1994: 104).

Law's study of modes of ordering the laboratory is concerned with the ways that different modes come into being and relate with each other. At the centre of Law's methodological approach are the narratives that people told about the history of the Laboratory. The telling of these narratives are instances where different 'modes of ordering' become apparent. Law argues that the stories are not indicators of the modes of ordering, rather they are themselves part of the ordering process:

> Stories are part of ordering, for we create them to make sense of our circumstances, to re-weave the human fabric. And as we create and recreate our stories we make and remake both the facts of which they tell, and ourselves. So it is that we seek to order, and re-order, our surroundings. So it is that we formulate, we try to sum up.
>
> (Law, 1994: 52)

In other words the narratives themselves are part of the ordering process. In a related methodological approach, Gottweis (1998) studies the textual narratives of biotechnology regulation in Europe and the USA. Gottweis presents a comparative account of the emergence of different policy narratives in which specific regulations make sense. He argues that these narratives serve to connect specific events and sites together in such a way as to make them governable under a regulatory regime. Gottweis studies the texts of governmental documents to trace the ways that they use wider narratives about technological progress to make sense of the proposed

regulatory approach (Gottweis, 1998). Here the attention is less on how the materiality of the text produces it meaning, but on how the narrative meaning of texts produce material orders through extending regulatory regimes.

Narratives are also central to Hilgartner's (2000) study of the performances of the National Academy. He analyses the ways that particular narratives give the performances momentum, and give meaning to the roles played by the different characters. He uses the text of the Academy's report, and letters exchanged in the pages of journals and newspapers, to attribute to the different interventions the underlying narrative of a morality play. The morality play structures the different moral standing of the major characters, including the Academy itself; and in the form of dramatic dialogue, these standings are called into question and defended. Hilgartner's study of the US National Academy of Sciences pays particular attention to the material and technological elements that go into framing social interaction. As Hilgartner puts it, the theatrical metaphor draws attention to the staging which separates front from backstage: "the typical play uses a variety of machinery – scaffolding, sets, lighting, costumes – to create and sustain this separation" (2000: 11). So, in adopting Hilgartner's methodological approach I do not view corporate texts as insubstantial carriers of language, but as material objects themselves, with life histories and journeys of their own.

Corporate modes of ordering their relations with publics produce texts which are meaningful in particular contexts. The interpretation of these texts is assumed in their production. In this sense, the techniques used by corporations to interact with their publics frame the situation of interaction. The corporation is a centre of translation which collects information about its potential audiences and sends out further texts to construct its public afresh. In this sense, following Callon (2002), the corporation can be understood as engaging in a continuous experiment of framing and reframing its publics. Using the empirical material I have gathered I focus on the performance of the corporation as a coherent and trustworthy actor in public controversy over GM foods.

In my methodological approach to studying corporate performances I have followed the actors of these performances from the pages of websites through to public

meetings and in some cases to research interviews. The production of the global socially responsible corporation discussed in Chapters 4 and 5 is maintained through specific moments at which these performances are produced. Through my research I have attended some of the conferences and meetings at which these performances have taken place. This has allowed me to supplement my textual analysis with observations of the localised negotiations which form part of the extended performance of corporate social responsibility.

Returning to the Alford quotation for a third time, I have also used semi-structured interviews with key participants to discuss their understanding of the corporate performances: "meanings are inferred from ... depth interviews that interrogate individuals about the way in which they interpret their experiences and social relations." (1998: 85).

As I discuss in further detail in the following section, the questions I asked in the interviews were related to how particular corporate policies have been designed and enacted. I do not assume that the interview transcripts that I have produced from these interviews are categorically different from my field notes taken at meetings or conferences, nor from the texts of corporate brochures. I understand them all as particular moments of performing the corporation.

The advantage of supplementing the study of publicly disseminated corporate texts with interviews is that these interview transcripts provide an additional view of the same corporate activities. This then enables my analysis to tease apart the ways that different discourses combine to perform 'the corporation'. In other words, carrying out interviews with different individuals provides a useful way to explore the different and sometimes contradictory constructions of the corporation. This difference of perspectives also highlights a reflexive point about the different roles that I have played in collecting and producing texts about the corporations.

As I have visited websites and read corporate documents I have acted as an anonymous member of the public. Whereas when I have arranged interviews and introduced myself as a social scientist interested in corporate engagements with public controversy over GM foods I am more narrowly defined in relation to the interviewee.

This different positioning of myself necessarily shapes the view of the companies to which I have had access. Through this research I am not constructing an objective account of universally produced corporate texts, but rather a particular account shaped by the positions that I have occupied. By adopting these different positions and triangulating the empirical evidence I have collected, I construct an account that is both grounded in my experience of specific engagements with the corporation and also generalised through the interpretive framework I use to analyse the material I have collected.

Returning to the Alford quotation for a final time, "The observer is seen as a participant in the co-construction of meanings" (1998:85). This stance, which Alford identifies as common to interpretive arguments is fundamental to my methodological approach. I have understood my empirical field site as a series of encounters in which I engage as an audience/interlocutor in moments of corporate self-performance. These specific moments, or 'plays', are in turn scenes of further plays. In particular, the relationship between two of these further plays are of crucial importance to my methodological argument. In the first, my encounter with corporate spokespeople is part of a wider performance of the corporation in the context of public controversy over GM foods. In the second, the corporate performance is part of my research project, and now thesis. Connecting these three plays is the concept of 'modes of framing' which I introduced in Chapter 2. These organisational modes of framing have emerged through the relations among each of the three plays: the moment of encounter between me as researcher/public and the spokesperson/corporation; the wider corporate performance in the context of controversy over GM foods; and the analytical argument I present in this thesis. In the following section I explain this interrelationship by giving an account of the specific research methods I used and the sites I investigated.

3.5 Studying corporate engagements with GM controversy: methods I have used

During 2001 my research questions shifted away from a direct concern with corporate innovation strategy towards an interest in the public presentations of companies in the context of controversy over GM foods. So, my empirical approach also shifted away from trying to get 'behind the scenes' of a company like DuPont to see "what *really* lies behind the tinted glass" (Law, 1994: 170). Instead, I became interested in the moments at which complex corporations are performed, and the interface between the 'private' world of the corporation and its 'public' exterior. Therefore, my principal methodological approach has been one of participant observation as I followed corporate performances through specific moments, played out in company brochures, websites, media reports, conference presentations and interviews.

In the following section I address detailed questions about how I did the research for this thesis, and comment on how this strategy relates to the methodological approach I have been developing in this chapter. First, I discuss which corporate documents I collected and how the texts I selected are elements in the production of a global, virtual, socially responsible corporation. Second, I describe how this global performance is punctuated by the embodied performance of corporate social responsibility at particular locations. I account for which sites I visited and what methods I used to engage with these localised moments of the performance of a global corporate identity. Third, I list the interviews that I carried out with actors involved in the performances of the corporations which I have followed in my research. I discuss my approach to the interviews and the analysis of the interview transcripts.

Finally in this section I describe how I have used the concept of 'modes of framing' to analyse the empirical material I collected. I use this concept in a way that does not set up a distinction between 'actors' categories and 'analysts' categories. The meaning of the text depends on the connections made between the texts and the materials that reproduce it, the objects which it represents, and the text's audiences and authors. In presenting the texts to illustrate the arguments of this thesis I am placing them in a new context; but I do so in a way that retains some of their important connections, to allow the development of an argument about the meanings that these texts have in the context of their production and other sites of consumption.

Collecting corporate texts

I have studied three multinational companies, DuPont, Monsanto and Unilever, and two public relations bodies, CBI and ABC. All five organisations produce texts of various kinds in the process of engaging with public controversy over GM foods. In each case the internet, and corporate websites in particular, are vital to their communications strategy. In collecting these texts I have been navigating the companies' websites as a form of 'virtual ethnography'. In her book of the same name, Christine Hine elaborates a strategy for practicing 'virtual ethnography' by remaining open to engagement with the internet at two levels: first, as a cultural form in which communities come together through exchanging information; and second as itself a sociotechnical artefact (Hine, 2000). My approach has focused on the internet as a medium for the staged presentation of corporate texts. However, as discussed in section 3.4, the text's content and material form are inextricably linked. Therefore I have also remained attuned to the ways that the websites have been produced and operated by their corporate authors (Rogers, 2002).

There are many websites run directly and indirectly by the five organisations I have studied; there are, however, eight sites that I have repeatedly returned to in following the corporate performances, see Figure 3.1.[22] I printed out the entirety of these sites in order to have a complete record of their content at a given point in time.[23] These websites are large, often exceeding 100 documents.

[22] The following website addresses were recorded during a survey of websites undertaken as part of this research in January 2003.

[23] I only printed relevant sections of the corporate websites of DuPont and Unilever.

• Monsanto's corporate website	www.monsanto.com
• "Biotech Knowledge Center": a Monsanto website containing a wide range of information about agbiotech	www.biotechknowledge.monsanto.com
• "Biotechnology Good to Grow": a Monsanto website for children to learn about agbiotech	www.biotechgoodtogrow.com
• DuPont's corporate website	www.dupont.com
• "Straight Talk about Biotechnology: Planting the Seeds of Promise": a DuPont website about agbiotech	www.dupont.com/biotech/index.html
• Unilever's corporate website	www.unilever.com
• The Council for Biotechnology Information website	www.whybiotech.com
• The Agricultural Biotechnology Council website	www.abcinformation.org

Figure 3.1 Principal corporate websites

In addition to these websites the main corporate documents that I referred to were speeches by the chief executives of the companies, which were downloaded from the corporate websites. I also referred to company annual reports and special reports published by the companies and ABC that related directed to public controversy over GM foods. Four of the most important of these reports are listed below:

New Choices, New Challenges, New Approaches (ABC, 2002)
Biotechnology Advisory Panel Report (DuPont, 2002a)
Fulfilling Our Pledge: 2000-2001 Report (Monsanto, 2002a)
Commitments to Our Stakeholders: 2001-2002 Monsanto Pledge Report (Monsanto, 2003a)

I coded the content of the websites that I had printed and the key documents listed above according to three overarching categories: narratives of 'the public'; narratives of 'biotechnology'; and narratives of the specific company or the agbiotech industry

as a whole. Within these categories I developed sub-categories that emerged from the content of the documents that I was coding.

I also traced the performance of these companies through their coverage in newspapers in the USA and UK. In addition, I subscribed to electronic newsletters that covered GM foods controversy; of these, three were particularly important. *The Biotech Advantage*, is a digest service run by Monsanto that appears about twice a month with a small number of news stories covering agbiotech in a positive light. *AgBioWorld*, is a digest that appears several times a week that contains positive news stories about agbiotech in addition to a digest of comments sent in by subscribers. As mentioned in Chapter 1, this news letter is run by C.S. Prakesh from Tuskegee University with funding from the agbiotech industry. *Ngin*, a prominent electronic news service based in the UK, carries anti-GM stories from around the world.

Through these various sources I have collected a wide range of texts in which the corporations have performed themselves in response to the GM controversy. As will be discussed in the following chapters, these interventions have performed the corporations as both global and also as accountable. There is often an implicit tension between the performances of the corporations as accountable and answerable to public concerns and yet lacking specificity about the places where these new forms of accountability will take place. However, performances of global, virtual corporations are punctuated by moments at which people from the companies engage in embodied presentations of corporate engagement with public debates about GM foods.

Public events

During the course of my research I have attended eight events at which I have followed the staging of corporate engagements with public controversy over GM foods. It is through such specific events at particular locations that global corporations are performed. It is therefore illuminating to observe the ways that spokespeople for the companies negotiate their roles as both an individual participant in a specific conference, and also as a spokesperson for a multinational corporation.

In my capacity as a participant observer I played different roles at each of these events. Most often I participated as a member of the public, as in the meetings of the UK Government's Agriculture and Environment Biotechnology Commission. Some of the events were academic conferences, which I attended as a research student. I also was involved helping to organise two of the academic meetings. At each of the meetings I took ethnographic field notes of the proceedings.

Biotechnology in the Global Economy: Science and the Precautionary Principle
Kennedy School of Government, Harvard University, 22-23 September 2000

Organised by Calestous Juma of the Kennedy School of Government. I met Tom Gaskin of DuPont who I subsequently interviewed, as discussed above.

Biotechnology and Global Governance: Crisis and Opportunity
Weatherhead Centre for International Affairs, Harvard University, 26-28 April 2001

Organised by Sheila Jasanoff of the Kennedy School of Government. I took part as one of the team of rapporteurs. This conference was directly relevant to the topic of my thesis, and many of the presentations dealt with how governments and corporations can learn from the experience of the European controversy over GM foods. Presenters included:
Ulrich Beck, Ludwig-Maximilian University
Sue Davies, Consumers Association, UK
Robin Grove-White, Lancaster University
Robert Herdt, Rockefeller Foundation
Robert Horsch, Monsanto
John Krebs, UK Food Standards Agency, UK
Helga Nowotny, Swiss Federal Institute of Technology (ETH)
Suman Sahai, Gene Campaign, India
Geraldine Schofield, Unilever Research
Brian Wynne, Lancaster University

Wynne, Grove-White and Schofield all talked about the research that resulted from Unilever's NGO dialogue, which I discuss in Chapter 4. Krebs talked about the new 'post-Philips' mood of British regulation, characterised by openness and transparency. Robert Horsch, from Monsanto talked at length about transparency, which I refer to in Chapter 1.

Food Safety, Food Quality, Food Ethics
EurSafe Conference, Florence, 3-5 October 2001

Eduard Veltkamp, Unilever's Senior Vice President Research & Development spoke about the importance of engaging with global citizens about the governance of biotechnology.

Science Communication Conference
The British Association, 30-31 May 2002

Keynote address was given by Geraldine Schofield of Unilever, who again talked about the Lancaster research, which I discuss in Chapter 4.

Agriculture Environment Biotechnology Commission (AEBC)
5-6 December 2001; 17-18 July 2002

GM Public Debate Steering Board
13 September 2002; 3 October 2002

I attended two of the public meetings of each of these bodies. At which Robin Grove-White played a prominent role. Stephen Smith, Chair of the ABC was a member of the Public Debate Steering Board. Julie Hill and Sue Mayer both of whom had taken part in Unilever's NGO dialogue are also members of the AEBC.

Transparency
Part of the Royal Society of Art's "Science, Citizenship and the Market" project
RSA, London 18 September 2002

This was organised by Jane Gregory of UCL's Science & Technology Studies Department. I took part in the discussions leading up the workshop and helped to run it on the day.

Many of the contributions to the workshop were relevant to my research. In particular Rachel Thom of the Institute of Grocery Distribution (IGD) was interesting as she talked about a tool that the IGD was developing to include citizen perspectives in the development of new food products. I meet up with Thom to discuss the work of the IGD (29 September 2002).

Biotechnology and the Environment Discussion
US Embassy, London, 4 October 2002

This discussion was organised by the Agricultural Section of the US Embassy in conjunction with the Soil Association. A heated debate was staged between Peter Melchett and Allan Felsot, a pro-biotech academic from the USA. Afterwards I talked to both Alyce Tidball who organised the event, and Peter Melchett.

Gene Futures: debating the use of GM crops and foods in the UK
Organised by GeneWatch, held at the RSA, London, 11 February 2003.

This event was organised by Sue Mayer of UK NGO GeneWatch as a contribution to the national public debate about the commercialisation of GM crops. Speakers included:

Bernard Marantelli, formerly of Monsanto, now of Lexington Communications (which has just taken over running the ABC from Weber Shandwick); Christine Drury of Unilever who talked about the Lancaster research sponsored by Unilever through its NGO dialogue (see Chapter 4); and Alyce Tidball, of the US Embassy.

As is apparent from the above list, the events I attended mostly took place in London, apart from two conferences in Cambridge, Massachusetts and one in Florence. This resulted in my having more opportunity to observe people engaged in Unilever's NGO dialogue giving public accounts of their work than was the case for the other companies I study. I have, however, also interviewed people from all of the companies and public relations bodies I have studied.

Interviews

When I interviewed the people listed in Figure 3.2 I approached the interview as a standard semi-structured qualitative interview (Silverman, 1993). As can be seen, most of the people I interviewed have not been named. Exceptions to this are five of the people I interviewed about Unilever's NGO dialogue and the heads of CBI and ABC, all these people gave me explicit permission to use their names. In fact when I showed an earlier draft of Chapter 4 to Geraldine Schofield and Christine Drury of Unilever in which I had used aliases, they asked me to use their real names. There is only one person for whom I use an alias and that is Tom Gaskin of DuPont. I do this because I refer to him several times throughout the thesis.

There was a difference between the interviews regarding the Unilever's NGO dialogue and the other interviews. This difference lay in the fact that the Unilever interviews were more focused on asking the interviewees to reconstruct events that had taken place over the previous decade. The other interviews were more concerned with the current policies of DuPont, Monsanto, CBI and ABC. (See Appendix C for examples of the two types of interview schedules).

interviewee	position	date of interview
DuPont:		
Anon	Research Scientist	23 January 2001
Anon	Research Scientist	23 January 2001
Anon	Research Scientist	23 January 2001
Anon	Research Scientist	23 January 2001
Anon	Senior Manager, R&D	3 January 2001
*Tom Gaskin**	Regulatory Affairs Manager	24 April 2002
Anon	Senior Manager, Regulatory Affairs	11 Nov 2002
Anon	Communications Manager	11 Nov 2002
Monsanto:		
Anon	Technical Manager, UK	7 October 2002
Unilever:		
Anon	consultant to Unilever	25 June 2003
Anon	Former employee	1 October 2002
Christine Drury	NGO and consumer affairs	7 October 2002
Geraldine Schofield	Regulatory Affairs	8 October 2002
Participants in Unilever's NGO dialogue:		
Sue Mayer	GeneWatch, UK	14 June 2002
Robin Grove-White	Professor of Environment & Society	3 October 2002
Julie Hill	Green Alliance	29 October 2002
CBI:		
Linda Thrane	Executive Director, CBI	22 February 2001
ABC		
Anon	Account Director, Webber Shandwick	12 June 2002
Stephen Smith	Chairman, ABC; CEO, Syngenta Seeds Ltd	3 October 2002

Figure 3.2 Interviewees

*Tom Gaskin is an alias, all other names are real, presented here with the express permission of the interviewee.

I tape-recorded all the interviews where the interviewee was happy to be recorded. I did not record my interviews with Linda Thrane of CBI or those at DuPont, apart from that with Tom Gaskin. In cases where I did not tape the interview I took detailed notes during the interview which I wrote up immediately following the interview. I have analyzed the interview transcripts as a further performance of corporate engagement in controversy over GM foods. The performance takes place in the

specific context of a research interview, but the central theoretical approach of this thesis is that all relations between 'the corporation' and 'the public' are mediated through the specific circumstances of the performance of those relations.

Given that many of the people I interviewed acted as official spokespeople for their companies or public relations body, the answers I was given to questions often sounded well rehearsed. This was especially the case when I asked questions that directly addressed different aspects of the controversy over GM foods. For example, when I asked the Executive Director of CBI, the North American public relations body, about how she came to that job she began by talking about her professional interest in writing and communications, then she changed her tone and spoke as if repeating a 'sales pitch':

> I strongly believe in the promise of biotechnology to feed the world's population, to feed people better, and to be sensitive and protective of the environment so that we can retain some of the wilderness areas.
>
> I find that there is a real sense of mission and conviction amongst many people who work with this technology.
>
> (Thrane, interview, 22 February 2001)

From collecting corporate texts, from taking field notes at public events and from interviewing participants in corporate engagements with public controversy I ended up with a vast amount of material. In all these texts the corporations are performed materially and discursively in ways that I describe in the following chapters. In the following section I address the question of how I analysed this material.

Analysing texts as corporate performances: 'modes of framing'

The traces of my ethnographic encounters with the highly charged field of corporate relations with 'the public' over GM foods have produced the texts which I use in the following chapters. The tensions which my interventions in this field set up are at the heart of my analysis: the tension between the text as artefact, the meaning of the text in the context of the interactions that it performs, and my interpretations as an academic interloper. The core of my methodological approach is a qualitative concern

with the ways that the corporate texts are engaged in processes of social and material ordering.

As I analysed the texts I collected I used the concept of 'modes of framing' to describe the discursive and material patterns to performances of the corporations. I use 'modes of framing' to understand the relationship between the meaning of the texts as they were produced in the research context; as elements in a wider performance of the corporation; and as they appear as elements of the argument written in this thesis. As explained in Chapter 2, the term 'mode of framing' owes its meaning in part to Law's (1994) study of the material and discursive 'modes of ordering' that produce organisations such as a laboratory, or, I argue, a corporation, and, in part, to Callon's discussion of how markets operate by constructing the means to calculate the consequences of economic exchange. Callon argues that such situations in which calculation occurs are achieved by the construction of a 'frame' around the actors and their actions. However, establishing this frame requires instruments and techniques which necessarily connect the framed situation with its context. With this material connection comes an impossibility of completely insulating the framed situation from the outside world, which overflows into the frame (Callon, 1998).

I have approached the study of corporate constructions of their relations with 'the public' by combining the concepts of 'mode of ordering' and 'framing'. The term 'mode of framing' calls attention to the fragility of the order which the companies produce. In other words, the companies frame situations of dialogue with consumer-citizens, but many people both inside and outside the company will ignore or contest these efforts. The term also calls attention to the overflows which necessarily accompany the act of framing. In other words, the techniques that the companies use to frame their relations with consumer-citizens bring with them new challenges which the companies must address.

3.6 Conclusions

After immersing myself in the field constituted by the public engagements of DuPont, Monsanto, Unilever, ABC and CBI, I came to identify three dominant modes of framing relations between 'the companies' and 'the public'. These three modes of framing provide the organisational framework for the three major empirical chapters in this thesis. In the first, DuPont, Monsanto and Unilever frame their relations with the public as 'dialogue'. In the second, DuPont and Monsanto frame their relations with the public in terms of corporate 'transparency'. Thirdly, CBI and ABC use a 'public relations' mode of framing.

In subsequent chapters I explore these three specific modes of framing. In Chapter 4, I discuss how DuPont, Monsanto and Unilever are performed by framing their relations with public concerns over GM technology in terms of 'dialogue'. This framing constructs an active 'consumer-citizen' as having rights to participate in the governance of innovation. In Chapter 5, I explore how the second mode of framing performs DuPont and Monsanto as 'transparent' to critical publics. This mode constructs the corporation as accountable and therefore 'socially responsible'. In Chapter 6, I discuss how a third mode of framing is made up of public relations techniques. Here the corporation is deconstructed and replaced by a body representing the agbiotech industry as a whole, which operates through intensifying the technological public sphere. Each of these three modes is developed by the corporations to cope with public controversy by rendering this newly vocal public calculable from the point of view of corporate strategy. However, none of the modes completely defines the relationship between corporation and public. The modes of framing are understood in this thesis as necessarily political innovations, producing institutional forms that open up new spaces for public engagement and new actors in the governance of corporate innovation.

Chapter 4

Corporate dialogue with consumer-citizens: how DuPont, Monsanto and Unilever are reframing relations with their publics

4.1 Introduction: corporate constructions of socially acceptable biotechnology

The entrance to DuPont's Building 38 leads into a glass atrium. This atrium is at the centre of DuPont's Nutrition & Health Division research function, which was formed when DuPont bought the world's largest seed company, Pioneer Hi-bred International, in 1999. On the morning of 24 April 2002 I had arrived in Wilmington, Delaware and taken a taxi to Building 38, which is only a mile or so from the valley where DuPont began as a gunpowder manufacturer in 1802. I was due to meet Tom Gaskin, who works in biotechnology 'Regulatory Affairs'. It was going to be the fourth time we had met, and this time he had agreed that I could tape the interview. As I waited, I could see across the atrium a brightly coloured stand, with posters, a laptop, brochures and a television screen.

The banner across the stand read "Straight Talk about Biotechnology". The images on display were taken from DuPont's website of the same name, which had been launched in 2000 to provide information about agricultural biotechnology to an interested lay public. The laptop was set up to show the "Straight Talk" website, and the television was playing highlights of a speech given by DuPont's Chief Executive Officer (CEO) in Boston on 22 September 1999. The CEO addressed what he called 'public concerns' about biotechnology by promising that DuPont would "engage and listen to all stakeholder groups" (Holliday, 1999: 6). What was the meaning of this speech now, over two and a half years later? And why was it being replayed at the heart of DuPont's corporate research facility? It is through such encounters with

moments at which 'the corporation' is performed that I have built up pictures of corporate engagements with public controversy over GM foods.

This chapter explores the co-production of consumer-citizenship with corporate institutionalisations of public dialogue. These institutional innovations are performed through dialogical modes of framing, which combine narratives of dialogue with expertise, techniques and representations that are new to the companies. This mode of framing configures the public as consumer-citizens with rights to participate in deliberations over corporate technology strategy. To address these themes, this chapter examines how three companies, DuPont, Monsanto and Unilever, have developed forms of 'public dialogue' in response to controversy over GM foods.

Each of these three companies has engaged in carefully staged performances of itself as a corporation engaged in listening to public concerns about GM technology. These performances emphasise the trustworthiness of the corporation by presenting the company as a coherent actor that has understood the errors it has made in the past and one that is now committed to public dialogue over biotechnology innovation. These public performances focus attention on the chief executive as the company's spokesperson. The company is presented in monolithic terms as a coherent and stable actor responsive to the will of its chief executive. However, in the cases of DuPont, Monsanto and Unilever, these performances of dialogue are intended to be sustained beyond specific interventions of the chief executives. To do this, the narratives of corporate dialogue are institutionalised by the three companies. They enrol experts and techniques from outside the firm in order to extend performances of dialogue over time and space. This chapter explores what happens to the performance of the corporation through the dialogical mode of framing as it is institutionalised.

The organisation of this chapter has emerged from the empirical materials that I collected as I journeyed through encounters with the public faces of the three companies. The public performances of the companies' chief executives were staged as speeches, which have since been reproduced on corporate websites, corporate videos, in brochures and press releases. The processes by which the companies have institutionalised corporate dialogue have taken place in a hybrid space within the companies and yet, by design, open to outside participants. As the corporations have

developed the dialogue mode of framing as their response to public mistrust, they have been careful to reveal aspects of the 'backstage' processes of corporate dialogue. Hilgartner's analysis of institutional region behaviour is highly relevant to the cases studied in this chapter. The companies engage in the careful construction of a front and backstage as part of strategic processes of revelation and concealment. I have collected the materials that the companies have produced to give public glimpses of the backstage processes of public dialogue. These constructions of the institutionalisation of corporate dialogue also occur in the interviews I have carried out with people from the three companies.

The following section illustrates the corporate performance of dialogue. The CEOs of DuPont, Monsanto and Unilever have all spoken of the need for corporations to earn public trust through engaging with public concerns about biotechnology. This section explores the narrative devices that operate across all three performances and which reinforce the heroic role of management in directing corporate dialogue with its publics. Section 4.3 follows the institutionalisation of dialogue at DuPont and Monsanto. It examines how these companies have represented the hybrid space of dialogue they have constructed by enrolling external expertise and techniques. Section 4.4 follows the case of Unilever's NGO dialogue, which began in 1994. The longer period of time Unilever's dialogue has operated and the access I had to interview participants has allowed me to explore the ways in which this institutionalisation of dialogue has produced tensions among members of the dialogue and within the company. These tensions undermine the monolithic constructions of the trustworthy corporation that are employed by the chief executive. An appreciation of the tensions inherent in corporate responses to the GM controversy highlights the potential for further opening up of corporate decision-making to consumer-citizen participation. In conclusion this chapter points to the tensions that accompany corporate framings of the public as 'consumer-citizens' of corporate biotechnology research. The new institutions that the companies have developed to reframe their relations with an active public open up new spaces in which the configuration of the consumer-citizen is brought into tension with corporate strategy.

4.2 Performing the listening corporation: generating trust through dialogue

Public controversy over GM foods in Europe provoked a crisis for agbiotech companies. As Chapter 1 has shown, the linear model of innovation which the companies were working with was challenged by their failure to commercialise GM crops in Europe during the late 1990s. While these companies had developed sophisticated strategies for dealing with customers and with government regulators, they were now confronted with the need to incorporate 'the public' into their conception of technological innovation and marketing. The failure of established modes of innovation not only interrupted the companies' strategies for developing biotechnology, but also disrupted the companies' identities as successful innovators. Both DuPont and Monsanto refer to themselves as 'science companies' or 'science-based companies', and even Unilever, focused as it is on everyday consumer products, identifies itself with science and technology: "innovation is the life blood of everything we do" (FitzGerald, 2000a). The question of how corporations should conceptualise and manage processes of innovation therefore goes to the heart of what it means for these three companies to operate as successful organisations.

Corporate identity is constantly being performed in the course of the companies' daily activity. The processes by which this identity is staged are more easily studied during periods of organisational stress because the companies go through a period of changing modes of self-presentation. In the case of DuPont, Monsanto and Unilever, the challenge to the linear model of innovation provoked the companies to engage in public self-examination; as is evident in the speeches given by the companies' CEOs examined in this section. All three companies have coped with what appeared to them as a crisis in the public acceptance of biotechnology by performing the role of a self-reflexive institution, able to adapt to changing social contexts.

DuPont, Monsanto and Unilever all engaged in carefully choreographed performances of themselves as corporations newly aware that the biotechnologies they develop must be 'acceptable' to the societies into which they are introduced. These performances reiterate the ability of corporations to act coherently. Corporate management embodies the role of decision-maker, able to develop techniques to frame, represent and act on societal attitudes to new technologies. These performances, which I

examine in this section, offer the corporations' own accounts of the crisis that they have confronted, and the steps they are taking to address these challenges.

The overarching narrative within which these corporate performances operate, and which they in turn reproduce, is one of a failure in the linear model of innovation. For example, this understanding is performed in presentations given by two managers, one from Monsanto and one from Unilever. In a presentation to a conference on business ethics during 2002, Monsanto's Vice President for Public Policy explained Monsanto's commitment to public dialogue in the context of a failure of the linear model of innovation: "Companies can no longer directly market their products – especially those involving what's perceived as a new technology – to consumers without first understanding and dealing with broader public issues and concerns" (Fish, 2002).

According to a presentation made by a Geraldine Schofield, a Unilever manager who works on food regulation, the linear model is replaced by what she referred to as networked relations. Addressing a conference in London on science communication, she explained the shift between the two models of innovation as being driven by a wide-spread loss of public trust in institutions. Under the new conditions, the market is no longer a sufficient mechanism for managing relations between the corporation and its customers. According to Schofield, Unilever no longer understands its consumers only in terms of their choices to buy a particular product. She argues that a thicker, fuller understanding of relationships among a greater variety of actors is now required by Unilever to facilitate innovation. Schofield uses the metaphor of the 'network' to describe the linkages that connect Unilever through its relations with "employees, customers/consumers, shareholders, public, and Governments" (Schofield, 2002: 1). This metaphorical understanding of the connections between a corporation and other actors in society underpins Unilever's representation of itself as a central node in a larger network of stakeholders:

> Trust in institutions has diminished together with the revelation that the marketplace is not a simple transaction between provider and buyer, but moving towards a partnership activity between industrial (and Government) institutions and society.

> This connected economy - one that is connected in ways not known before - is connected not just from one person or company to another, from one buyer to one seller - but as a network of multiple and simultaneous linkages. The techno-economic network is not linear but multi-dimensional.
>
> (Schofield, 2002: 1)

These two presentations of the context in which the companies are engaging in dialogue over biotechnology suggest a 'networked' understanding of the innovative corporation. This corporation is performed as open to a wider range of knowledges and actors when making decisions about biotechnology. The narrative of the listening corporation performed by the three chief executives provides a contrast with this more open performance of the corporation. This contrast illustrates a tension that runs through the dialogue mode of framing.

Performing the dialogical CEO

Central to the performance of DuPont, Monsanto and Unilever as dialogical corporations was the role of the CEO as the company's spokesperson. Each of the three CEOs[24] gave a key speech responding to public controversy over biotechnology. DuPont's CEO delivered his speech on 22 September 1999, the Unilever speech was given just over half a year later, on 11 April 2000, and Monsanto's on 27 November 2000.

This section analyses these speeches as particular performances of the dialogical corporation. These performances are structured by a narrative of society and corporate transformation that is shared by all three speeches. The narrative's dramatic arc begins with a the loss of technological promise due to public mistrust in science, governments and corporations. The role played by the corporation is one of a reflexive institution able to understand the changed context for innovation and to begin a process of public dialogue, which will restore public trust.

[24] In the case of Unilever, the speech was given by one of the company's two Chairmen, who together function as the company's chief executive officers.

The speeches themselves enacted this transition to a more dialogical mode of innovation by demonstrating the seriousness with which the companies took public concerns about biotechnology. Indeed, to emphasise the break with previous ways of dealing with innovation the Monsanto speech was titled "A New Pledge for a New Company".[25] Both the Monsanto and DuPont speeches announced new corporate commitments to engage with public concerns, whereas the Unilever Chairman referred to the company's ongoing dialogue with NGOs as evidence of its commitment to engage with public concerns.

In performing the newly open corporation, the speeches emphasised the personal commitments of the CEO, who embodies the corporation's newly trustworthy persona. In the case of the DuPont and Monsanto CEOs in particular, they handled this by appearing both responsive to public concerns and able to direct their corporation in the light of this dialogue. The chief executives performed their role as captains of industry, with their hand on the tiller and eyes scanning the horizon. It is in this role that they spoke for the companies they represent. The large and sometimes diffuse interests of large multinational corporations are embodied by the speaker, who, as Law (1994) points out, is dependent on the corporation's organisational and material resources to reproduce their words and make them meaningful.

The CEO can speak for an entire corporation only through the careful staging of the speech; each major speech was announced in press releases, reproduced on corporate websites, and recorded in promotional material. In the case of DuPont (Holliday, 1999) the speech was the subject of a press release and it was covered in the press (Financial Times, 1999; Wall Street Journal, 1999; Scotland on Sunday, 1999). The media reaction to the Monsanto speech (Verfaillie, 2000a) was more widespread, and included articles in the *New York Times* (2000), *Financial Times* (Tait, 2000) and *The Guardian* (Vidal, 2000). There was less press coverage for the Unilever speech, although FitzGerald did publish a shortened version in the *Financial Times* (FitzGerald, 2000b). So it was, that April 2002 I stood in DuPont's Building 38 watching a video of the company's CEO repeating the speech he had made a year and a half earlier and committing DuPont over and over again to more dialogue.

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[25] The Monsanto speech followed one month after the company was re-launched on the New York Stock Exchange, see Appendix B.

The DuPont, Monsanto and Unilever speeches construct a common diagnosis of the challenge the companies face in commercialising products of biotechnology. In order for the CEOs, embodying the newly trustworthy corporation, to act as the hero of the day, the speeches first set the scene of the crisis. Hilgartner (2000) identified a morality tale at the heart of the performance of legitimacy by the US National Academy of Sciences, in which scientists struggle to arrive at the truth through collaborative reflection on the facts in the interests of the nation. The agbiotech corporations employ the narrative device of a tale of lost promise. All three speeches employ a remarkably similar narrative, and the scene of lost technological promise caused by public mistrust is common to them all.

In their diagnosis of the GM food controversy, the CEOs did not discuss specific critiques of the commercialisation of agricultural biotechnology, nor did they elaborate on the character of the public whose trust they hope to regain. Rather, this scene of public mistrust is established as a backdrop for action by the corporations. The CEOs described a societal transition away from a period when the public trusted corporations to develop new technologies and governments to regulate them. Although the corporations have only talked about public trust since they began to identify a lack of trust, they have subsequently credited trust as providing the foundations for a 'golden age' of technological innovation (see Figure 4.1).

As the quotations in Figure 4.1 illustrate, the speeches do not explicitly locate the scene they set. The executives talked about 'society', about 'the public', and 'people' who are identified by their situation in the present era rather than their location in space. However from the context of the speeches, it is clear that the societies they refer to are related to the corporations through the extent of the companies' markets. In his speech, the DuPont CEO, Holliday, recalls the "awe and fascination" with which people of a bygone era received DuPont's invention of nylon. As in the DuPont speech, Monsanto's CEO, Verfaillie, is not specific about the society to which he refers. However, by contrasting contemporary society with that of 40 years earlier, he invokes the transformations of 1960s USA. The publication of Rachel Carson's *Silent Spring* in 1962 was an important moment for the US chemical industry. It is taken by people in the industry to define the point at which US public opinion turned against

the promise of progress through chemistry.[26] Unilever's Chairman also indicates the dramatic shift in public attitudes by referring to 'near-Medieval' suspicion of science and technology (see Figure 4.1).

> While all of this [biotechnology] sounds very promising, we are finding that, *unlike the 1930s when people greeted the miracle of science that was nylon with a sense of awe and fascination, there is growing public concern with the use of genetic enhancement*, particularly as it relates to food. This public concern has been aggravated by the perception that we in industry have often acted as though public fears are not legitimate and are the result of ignorance.
> (Holliday, 1999: 2)
>
> And we are doing this at a time when a shift in society – a shift that started perhaps 40 years ago – is approaching full maturity. That shift has been a movement from a "trust me" society to a "show me" society. We don't trust government – and thus government rulemaking and regulation is suspect. *We don't trust companies – or the new technologies they introduce into the marketplace.* We don't trust the media – or the news they bring us each day. And so it goes with all institutions.
> (Verfaillie, 2000a)
>
> The fact is we now stand at a crucial juncture in the history of science in our society. I think few people would argue if I said that throughout Colworth's fifty years in the vanguard of innovation, *public trust of science and scientists has never stood at a lower level than it does now.* A series of events, including some mistakes and some misrepresentations, has created what can only be described as a 'near-Medieval' level of suspicion among the public at large.
> (FitzGerald, 2000a)

Figure 4.1 CEOs diagnosis of a crisis of public trust in established modes of innovation (emphasis added)

Having set the context for performances of the dialogical corporation, the common narrative shared by the speeches then moves to establish the corporations' agency in the story. As the problem is identified as one of public mistrust, the corporations are therefore performed as able to manage this mistrust. According to the narrative, the means by which they will achieve this is through listening to public concerns about biotechnology.

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[26] Monsanto responded to *Silent Spring* when it was published by writing a parody titled "The Desolate Year" in which insects, uncontrolled by chemical pesticides, destroy the countryside (Leonard, 1964).

In his speech to the biotech business conference, DuPont's CEO, Holliday, addressed the biotech industry as a whole about its responsibility to engage in dialogue with public concerns about biotechnology. Holliday suggested that industry must respond collectively to public mistrust, which he argued had been caused by industry's arrogance in dismissing public concerns as irrelevant (see Figure 4.2). In focusing on how institutions such as corporations should treat public concerns as legitimate, and by taking seriously the uncertainties that attend technological risks, Holliday was reflecting arguments in the social sciences about the governance of technology (most notably in this case, Grove-White *et al.*, 1997).

Likewise, the speech delivered by Monsanto's CEO, Verfaillie, shared much of Holliday's analysis of contemporary public attitudes to biotechnology. But whereas Holliday talked about the collective responsibility of the biotech industry, Verfaillie focused on Monsanto's role in public debates about GM foods. His speech adopts a confessional tone, in which he acknowledges that Monsanto had been "blinded by our own enthusiasm" for biotechnology and had therefore ignored public concerns. The difference between DuPont's identification of a collective industry responsibility and Monsanto's confessional tone is a consequence of the particular role of Monsanto in controversies over the commercialisation of GM crops. The construction of a collective industry communications campaign, and Monsanto's place in it, will be discussed in detail in Chapter 6.

In the speech by Unilever's Niall FitzGerald, the central role of the corporation is reasserted. Here, one of the underlying tensions that occupies this chapter is brought to light: the extent to which the mode of 'dialogue' offers a radical shift in the social relations of corporate innovation, or becomes a means for the instrumental reconstruction of public trust in industry. In the quotation from FitzGerald's speech in Figure 4.2 it appears that he does not question the "benign nature of genomics-based products" but only the way that Unilever has been communicating with consumers.

> [T]he point is that "we" in industry must do a much better job of engaging, listening to and addressing the concerns of all stakeholders in this global debate. One of the first things we must do is acknowledge concerns about unknown risks. Unfortunately, many in industry have been reluctant to address concerns about the risks of biotechnology. But we have to listen to the people who are now raising alarms. *We don't have all the answers and to pretend we do, or to brush off concern as unfounded, is to be arrogant and reckless.*
>
> (Holliday 1999: 2-3)
>
> We missed the fact that this technology raises major issues for people – issues of ethics, of choice, of trust, even of democracy and globalization. We didn't understand that when it comes to a serious public concern, that the more you stand to make a profit in the marketplace, the less credibility you have in the marketplace of ideas. When we tried to explain the benefits, the science and the safety, *we did not understand that our tone – our very approach – was seen as arrogant.* We were still in the "trust me" mode when the expectation was "show me".
>
> (Verfaillie, 2000a)
>
> We in industry need to understand not only the aspirations, but also the concerns, of consumers. *Some see this technology as the preserve of a small group of companies and individuals, and not unnaturally, this worries them.* So as well as communicating the benign nature of genomics-based products, and their benefits, we also need to listen and understand.
>
> (FitzGerald, 2000a)

Figure 4.2 CEOs blame industry for appearing arrogant (emphasis added)

The speeches by each of the three companies' chief executives agree in their diagnosis of the problem as a lack of trust in science, government and industry. They also agree that the solution to this problem is for the companies to engage in 'dialogue'. The similarity between the speeches is remarkable given the differences between the three companies. DuPont is a diverse company which hopes in the future to apply biotechnology across a range of product sectors (DuPont, 2000c); Monsanto is focused on agriculture and accounts for the vast majority of global sales of GM seeds (James, 2003); and Unilever is a consumer goods company based in Europe, whereas both DuPont and Monsanto are based in the USA.

The three speeches tell the story of declining public trust in existing modes of technological innovation, with the assumption that corporations are in a position to intervene in this process. For the chief executives of these companies, their framing of

the social context for their businesses is predicated on their commitment to 'manage' the corporations. Complex relations characterising the social relations of controversial innovation are described in ways that imply their manageability. However, commitments made on behalf of the corporations to engage in greater dialogue explicitly acknowledge the plurality of knowledges that are relevant. Dialogue, then, can be understood as a management tool for coping with complexity. The DuPont speech illustrates the corporate understanding of dialogue as providing the company with new perspectives to cope with public mistrust of biotechnology (see Figure 4.3).

Unilever's CEO, FitzGerald, speaks as the head of a consumer goods corporation that is more accustomed to collecting and processing knowledge about consumer preferences and attitudes to new products. However, the notion that publics reflecting as citizens might have important views about the technologies used in the consumer products is new to Unilever (see Doubleday, 1999). FitzGerald also expresses an understanding that there is a causal relationship between dialogue and trust (see Figure 4.3).

> *Listening implies engagement and respect*, and that requires initiative, patience and the willingness to build relationships that will provide a point of view and perspective that may be counter to our own.
>
> (Holliday, 1999: 3)
>
> About a year ago, many people from Monsanto started to meet with people outside the company. We met with scientists, with activists, with government regulators, with farmers, with consumers, with food manufactures and processors, with academics, with news media, with associations and foundations that provide help and aid to developing countries, with friend and foe alike. *We said to them, help us understand what has happened.*
>
> (Verfaillie, 2000a)
>
> Yet as we push back the frontiers of what is possible, we must always remember that science is a means, not an end. To all of us here perhaps, it seems obvious that our work will benefit consumers in real, practical ways. But *we have to win people's trust by engaging in a frank dialogue* – or else we may never get the opportunity to deliver them.
>
> (FitzGerald, 2000a)

Figure 4.3 CEOs prescribe 'dialogue' as the solution to public mistrust (emphasis added)

The speeches are not only performances of corporate humility, designed to counter public impressions that the companies are arrogant and dismissive of public concerns. They are also expressions of corporate struggles to understand the contemporary context for their innovation strategies. Their existing models of innovation were of linear processes that began in scientific laboratories, passed through commercial development, regulatory approval and then reached the marketplace. Public interest was represented in the operation of the regulatory state and the market. However, strategic decisions taken within the companies about research and development depend on predictions about the social reception of new technologies, which these three speeches suggest are now uncertain. The speeches therefore represent a moment when the corporations are expressing a need to develop new models of technological innovation.

The speeches by the chief executives of DuPont and Monsanto both marked a shift in corporate strategy towards public controversy over GM foods. Both performances of a dialogical corporation included commitments to institutionalise greater dialogue within the company. This suggests that the CEOs were aware of the contradiction of promising that the company has changed in order to repair public trust. If the problem is a lack of public trust in the corporation, why would they believe the CEOs? Therefore, the speeches indicate that corporate performances of dialogue will be extended beyond the moment of the speech.

The centrepiece of the DuPont speech is four commitments designed to ensure the social acceptability of its agbiotech innovations. These four commitments are to greater dialogue; to providing more information about biotechnology; to use more renewable resources; and to develop biotechnology safely. The commitment to dialogue is described as consisting of an expert advisory panel and ongoing consultation of stakeholder groups. The Monsanto speech follows the same model as that delivered over a year earlier by DuPont, and it ends similarly with five pledges, the first of which is titled "dialogue". The second pledge is for more "transparency"; the third is to "respect" ethical concerns; the fourth is "sharing" GM technologies with developing countries; and the fifth is to increase "benefits" to farmers and consumers. Returning to the first pledge commitment, the similarity with DuPont's commitment to dialogue is obvious (see Figure 4.4).

First, we will engage, listen and adjust. We will create a global, biotechnology advisory panel to guide our actions, help us create positions on important issues, and guide and challenge us in the development, testing and commercialization of new products based on biotechnology. We will also ask this panel to audit our progress and provide a public report on a regular basis. In addition, we will engage and listen to all stakeholder groups, including biotechnology critics, to understand their positions and seek their advice on our strategies and direction. From our experience in the environmental area, we know that this process will have an impact on our thinking and actions.

(Holliday, 1999: 6)

Dialogue

We commit to an ongoing dialogue with all interested parties to understand the issues and concerns related to this technology.

- To this end, we commit to create an external Biotechnology Advisory Council from a range of constituencies with an interest in biotechnology to meet, discuss, advise and help us make decisions.
- And we commit to involving our customers to help us make decisions about the development, use and stewardship of new agricultural technologies.

(Verfaillie, 2000a)

Figure 4.4 DuPont and Monsanto commitments to dialogue

The Unilever speech does not offer new pledges to engage in dialogue, however, it does refer to activities already undertaken by the company in terms of its "commitment". It stresses that dialogue is a technique that is used in attempts to rebuild trust in technology:

> This means businesses like ours have a major responsibility to assist in the rebuilding of trust and confidence in innovation and new technology. Our commitment to achieving this through dialogue has been demonstrated repeatedly, not least by our participation with Lancaster University in the 'Uncertain World' research into public attitudes to GMOs. This work has underlined the importance of connecting with people as both consumers and citizens.
>
> (FitzGerald, 2000a)

All three speeches are expressions of a corporate framing of social controversy over biotechnology in terms of public mistrust of science, governments and industry. Implicit in this framing is the notion that society is becoming more complex, and from industry's perspective, public reactions to new technologies are becoming less predictable. In order to cope with this complexity, corporations are seeking to engage

with public attitudes as part of their innovation of new technologies.[27] In particular, dialogue is considered an important way of improving corporate understandings of public attitudes, which can then be used to formulate corporate strategy. To the extent that dialogue is invoked in questions of public decision-making it echoes the shift in attention from 'government' to 'governance' (Munton, 2003). The emphasis is placed on the wider distribution of authority in society, so that questions of public good are not confined to the institutions of the state – as is the case in government – but become dispersed among a wider range of social groups. This is a problem not only for political theory, but also for the management of complex business enterprises.

The CEO's speeches can be understood as a performance of the corporation in the sense that Hilgartner (2000) uses the term to describe the self-presentation of the US National Academies of Science. In his study, Hilgartner shows that the institution constructs boundaries around what is in the public domain and what is not, in the context of presenting itself as a credible actor in the public arena. The CEO's speeches are carefully staged by the corporations – in other words, attention is paid to who the CEO addresses, and how the speech is circulated. Using Hilgartner's approach, it is also possible to understand the speeches themselves as staging the corporation. The relations between a 'concerned public' and the 'decision-making corporation' are discursively performed as dialogical. This constructs new boundaries around the corporation, making the previously private world of corporate research strategy partially open to public engagement.

The speeches as performances depend on particular narratives of the corporation as a reflexive institution responding to public mistrust. In this narrative of dialogue, companies do more than listen, they act on public concerns to ensure the 'social acceptability' of the biotechnology products they develop. In order to do this the companies have defined through their practices of dialogue two concepts which were new to their strategic decision-making: 'public concerns about technology' and 'socially acceptable technology'. In particular, the notion of achieving social acceptance of technological change through corporate initiatives of public dialogue extends the corporate imagination of the public beyond consumers of biotechnology's

[27] Processes to take account of a technology's social implications during its innovation have been developed under the banner of 'constructive technology assessment' (Rip *et al.*, 1995).

application in an end-product. The dialogue initiatives frame the public as citizens with valid concerns about the benefits and risks of biotechnology. In the next section I explore how the performances of the dialogical company are extended by DuPont and Monsanto through institutionalising the dialogical mode of framing.

4.3 Institutionalising dialogue at Dupont and Monsanto

The high profile speeches delivered by the CEOs of DuPont and Monsanto were performances of multinational corporations engaging in dialogue with 'society' in order to repair public trust in corporate biotechnology innovation. These specific performances reached, and continue to reach, audiences both within the companies and beyond as they are reproduced in a variety of media using techniques of public relations. However, if the corporations wanted to include 'public concerns' in their decision-making their commitments to 'dialogue' needed to be institutionalised. And if they wanted to earn public trust in the context of the highly charged controversy over GM foods the companies felt that they had to go further in their demonstrations of 'dialogue'. As Monsanto's CEO said in his speech: "We also recognise that we have to do more than talk about these commitments. We have to do them" (Verfaillie, 2000a).

Corporations are sites at which managers are able to exercise strategic discretion. The creation of a context in which 'decision-making' can occur requires the ordering of representations about the world beyond the immediate situation in which the decision is taken. In other words, it must be possible for the managers at DuPont and Monsanto to arrange devices to record, represent and accumulate information about the world as it is and the possible changes that would arise from their decisions. Callon (1998) has described the conditions necessary for the calculative action of market exchange in similar terms.[28] The transition marked by the three speeches examined in the previous section requires the three corporations to include a new actor in calculations at the heart of strategic decision-making about the companies' biotechnology innovation: the concerned public.

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[28] Callon also discusses the requirement for ranking the various possible outcomes, and the ability of the calculative agent to identify the consequences of their actions with respect to the possible outcomes (Callon, 1998: 4).

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This section explores how DuPont and Monsanto have institutionalised their performance of listening to public concerns. These performances are intended not only to rebuild public trust in the companies as developers of GM products, but also to include information about public attitudes in the decision-making process. DuPont and Monsanto have institutionalised their commitment to dialogue by setting up advisory bodies to assist them in understanding public concerns. These bodies are designed to enable managers to incorporate consideration of 'public concerns' about biotechnology in strategic decision-making. The corporations attempt to achieve centres of calculation by framing their relations with concerned publics in such a way as to translate diverse public concerns into social intelligence applicable to corporate decision-making. However, following Callon (1998), this section argues that in situations where the range of actors, the scope of concerns, and the relevant knowledges are contested, framing is always incomplete. Actors and their concerns that had been excluded from the framing overflow back into the frame, disrupting the corporation's ability to operate as a centre of calculation.

The empirical material for this section comes from a variety of sources, including websites, brochures, presentations and interviews. Through each text the corporation is being re-performed. Thus, despite the various and discontinuous range of media through which corporate representations are carried, the coherence of 'DuPont' and 'Monsanto' as social actors is reproduced. An important element in these stagings of the corporation is the 'region' behaviour which separates the private backstage areas from the public front stage. This chapter explores the apparent paradox that complex, private negotiations are required in order to institutionalise corporate openness through dialogue. This presents the companies with a dilemma as they are eager to win public trust by demonstrating that they are engaging in dialogue. What results are carefully choreographed glimpses backstage designed to show how these dialogue initiatives have worked in practice.

This section argues that there are three aspects to the attempts of DuPont and Monsanto to establish such centres of calculation. First, DuPont and Monsanto attempt to enrol a global public by recruiting a range of experts on topics which the corporations imagine encompass public concerns. Second, these expert advisory groups translate public concerns into representations that are commensurable with the

existing corporate modes of decision-making. Third, enrolment and translation are elements of a process by which the companies are reframing their relations with this newly emergent actor, the 'concerned public'. This reframing creates a space in which the dialogue takes place. In this carefully managed space DuPont and Monsanto, as corporations, enter into dialogue with the 'public'. This performance is itself relayed to a wider audience of potentially concerned publics. The advisory bodies thus function as a 'play within a play', the objects of which are both to translate public concerns into terms that can be used in corporate decision-making, and to demonstrate that DuPont and Monsanto are taking public concerns seriously, and can therefore be trusted to continue to develop GM products.

Framing 'the public' as an actor in corporate innovation strategy

The chief means by which DuPont and Monsanto attempt to publicly demonstrate their new commitment to dialogue is through their advisory groups. The formation and functioning of their advisory bodies is carefully reported and the details are widely disseminated. The reporting of the dialogue initiative is itself part of the corporate process of relating to wider society over public concerns about biotechnology. In both cases the establishment of these two bodies is meant to represent that the corporations are listening to, and acting on, a wide range of views about biotechnology.

At the centre of both the DuPont speech of September 1999 and Monsanto's of November 2000 is the notion of a concerned public. This public appeared in the speeches as globally undifferentiated. Both DuPont and Monsanto made commitments to engage in dialogue with this public, which it promised to achieve by establishing advisory bodies (see Figure 4.4). It is in this context that the first meeting of DuPont's Biotechnology Advisory Panel took place in February 2000, and Monsanto's Biotechnology Advisory Council first met over a year later, in May 2001. These groups were made up of about five to ten people who met at roughly six monthly intervals (see Table 4.1).

Company:	DuPont	Monsanto
Name:	Biotechnology Advisory Panel	Biotechnology Advisory Council
First meeting:	February 2000	May 2001
Meeting frequency:	About every six months	About every six months
Facilitator:	Resolve, replaced by Keystone during 2001	Keystone
Published outputs:	"Biotechnology Advisory Panel Report" (Aug 2002)	Reported in: "Fulfilling Our Pledge" (Jan 2002) "Commitments to Our Stakeholders" (2003)

Table 4.1 Institutionalised dialogue at DuPont and Monsanto (DuPont, 2000a; 2001; 2002a; Monsanto, 2001a; 2002a; 2003)

What are the qualities of the specific individuals chosen by the companies to participate in the stakeholder dialogues? What characters would be able to perform the role of representing societal concerns to the corporations, and simultaneously representing the corporations' responsible innovation to society at large? In their announcements about the advisory groups both DuPont and Monsanto have emphasised the diversity of the members, both in terms of areas of expertise and their national home. The publication of the groups' membership is a significant element in the efforts of the two companies to communicate the seriousness with which they take the process. The advisory groups set up by DuPont and Monsanto both contain senior academic scientists and bioethicists, as well as leading people from NGOs concerned with international development and the environment (see Tables 4.2 and 4.3).

member:	expertise:	affiliation:	tenure:
Andre Capron	Professor of Immunology	Insitute Pasteur de Lille	February 2000-August 2001
Arthur Caplan	Professor of Bioethics	University of Pennsylvania	February 2000-Present
Chunming Chen	Professor of Nutrition	Chinese Academy of Preventative Medicine	August 2001-Present
Braulio de Souza Dias	Ecologist	Ministry of the Environment, Brazil	August 2000-August 2001
Pablo Eyzaguirre	Anthropologist	International Plant Genetic Resources Institute, Italy	December 2002-Present
Carol Tucker Foreman	Consumer advocate		December 2002-Present
Jonathan Lash	President	World Resources Institute, USA	February 2000-Present
R. K. Pachauri	Director	Tata Energy Research Institute, India	August 2000-July 2002
V. Prakash	Director	Central Food Technology Research Institute, India	December 2002-Present
Tiahoga Ruge	President	North American Centre for Environmental Information and Communication, Mexico	February 2000-July 2002
Florence Wambugu	Director	Harvest Biotech Foundation International, USA and Kenya	February 2000-Present

Table 4.2 Members of DuPont's Biotechnology Advisory Panel (DuPont, 2000a; 2000b; 2001; 2002a; 2002b)

member:	expertise:	affiliation:	tenure:*
Annika Ahnberg	Swedish Minister of Agriculture, 1996-1998		2002, 2003
Jeroen Brordwwijk	Senior Vice President	Unilever	2003
Gelia Castillo	Professor of Rural Sociology	University of the Philippines Los Baños	2002, 2003
Alejandro Delfino	Director	Sociedad Rural Argentina	2002, 2003
Don Doering	Senior Associate	World Resources Institute, Washington, DC	2001, 2002, 2003
Tom Ewing	US congressman (former)		2001, 2002, 2003
Lynn Goldman	paediatrician	Johns Hopkins University	2001
Ruth Oniang'o	Director, Rural Outreach	Kenyan MP	2002, 2003
Irwin Rosenberg	Dean, School of Nutrition	Tufts University	2003
Jeffrey Sachs	Director, Earth Institute	Columbia University	2001, 2002, 2003
Paul Thompson	Professor of Biology and Philosophy	University of Toronto	2001, 2002, 2003
Eduard Veltkamp	Senior Vice President	Unilever	2002

Table 4.3 Members of Monsanto's Biotechnology Advisory Council (Monsanto, 2001a; 2002a; 2003) *dates of report in which membership is recorded

A year after he first announced the pledges, Monsanto's CEO returned to the Farm Journal Conference in Washington DC and gave a speech that followed up on the implementation of the pledges he had made. In the speech, Verfaillie highlighted the role of the Advisory Council in translating public concerns over biotechnology for the

company, and suggested that the Council was able to do the work of translation because its members represented a wide range of public concerns. There are two dimensions to the identity of the Council membership which allow them to perform this function. The first is the expertise or arena that the members represent; in the case of Monsanto's Council: science, business and policy. The second is the Council's global composition (see Figure 4.5).

In the September 1999 speech by DuPont's CEO, in which the establishment of its Advisory Panel is announced, he describes it as "global" (Holliday, 1999: 6). And when DuPont introduces the first five members of the company's Advisory Panel on its website it calls attention to the origin of Panel members, particularly when those origins are outside the USA (see Figure 4.5). At the same time the introduction highlights the expertise of panel members. The quotation in Figure 4.5 draws attention to these two features. The members are qualified by DuPont's introduction by terms like 'leading' and 'internationally known', which suggest the importance of expertise. Given the role that the Panel is to fulfil, expertise in diverse arenas appears to act as a guarantee of the members' ability to represent public concerns.

Monsanto:
We formed... the Biotechnology Advisory Council - *representing science, business and policy leaders from around the world.* This council, which met for the first time in May, helps us understand public concerns more deeply and respond more effectively.

(Verfaillie, 2001)

Monsanto extended invitations to the members of the Biotechnology Advisory Council based on their *high credibility, expertise in a diverse range of relevant areas*, and personal interest in issues surrounding agricultural biotechnology.

(Monsanto, 2001a)

DuPont:
Members of the advisory panel include a leading bioethicist at the University of Pennsylvania; the president of the World Resources Institute; director of a Mexico City-based organization dedicated to environmental education; an internationally known scientist in Nairobi, Kenya, who is working to alleviate hunger and poverty by increasing crop productivity; and, internationally known scientist in immunology of infectious and allergic diseases.

(DuPont, 2002c)

Figure 4.5 DuPont and Monsanto advisory group member descriptions (emphasis added)

By emphasising the seniority and expertise of the advisory groups, both DuPont and Monsanto are seeking to establish the legitimacy of these bodies as 'hybrid forums'. If these bodies are to succeed in institutionalising the dialogue mode of framing then the participants must be able to speak for the concerns of consumer-citizens who are unable to take part in the deliberations of the advisory groups. The language that DuPont and Monsanto use to describe the groups demonstrates the intimate interconnection between issues of political legitimacy and epistemic credibility. The ability of the groups' members to represent the concerns of the wider public stems from their claims to knowledge about the risks of biotechnology and public social and ethical concerns.

As both Monsanto and DuPont's advisory groups are intended to help the corporations develop a fuller understanding of social attitudes to biotechnology, the composition of the groups is important in defining what range of concerns can be represented. The groups are intended to help the corporations manage the problem of the social acceptability of a technology and try to do this by encompassing a diversity views within their membership. This is contrasted with the linear model of innovation in which the social diffusion of a technology depends on its approval on scientific grounds by regulators as safe, and its success in the marketplace.

Throughout DuPont and Monsanto's reporting of their advisory committees they emphasise the diversity of the panellists (see Figure 4.6). Diversity in areas of expertise, but also diversity in terms of sector – business, NGO, scientist – and diversity in terms of global distribution. This is interesting in terms of the construction of the problem of public trust; that the governance of biotechnology innovation is not only a multidisciplinary question, but is also a global concern. The establishment of this global relationship through the institutional form of advisory bodies provides a telling example of corporate processes of globalisation.

DuPont website:
The Biotechnology Advisory Panel *represents a diversity of international interests, academic and vocational expertise, and cultural backgrounds.* All are cautiously optimistic about the potential good biotechnology can do as the world struggles with how to deliver safe and nutritious food to the world's populations while decreasing the use of chemical pesticides. At the same time, the Panel members are well aware of the unknowns and potential downsides associated with biotechnology.

(DuPont, 2002a: 2)

Monsanto press release:
"We made a commitment though the Monsanto Pledge to listen better, learn from what we are hearing, and in some cases, act and do things differently," said Verfaillie. "By establishing a Biotechnology Advisory Council, we've put in place a formal mechanism to engage a *diverse group of people from a variety of disciplines and perspectives* in dialogue and turn what we hear into action."

(Monsanto, 2001)

Figure 4.6 DuPont and Monsanto advisory group diversity (emphasis added)

DuPont and Monsanto's presentation of the membership of the two advisory bodies suggests the ability of this small group of individuals to represent the concerns of a diverse globally distributed public. The problem of framing corporate relations with their publics is radically reduced if all public concerns can be represented round a table once every six months. An important element in the presentation of the advisory groups in this light is not only the diversity of their membership, but also the expertise of the members. As Ezrahi has argued, modern liberal democracies like the USA rely on the work of technical experts, whose opinions are representative of their expertise rather than their subjective point of view:

> [P]resuppositions of representation and the idea that experts can optimalize the technical effectiveness or efficiency of public actions imply that the actions of public officials, like the actions of physicians or engineers, can be made sufficiently detachable from the subjective values of their agents to warrant trust in their integrity as functionally representative. Engineers, unlike artists, are expected to act such that their actions are alienable from their personal selves.
>
> (Ezrahi, 1990: 45)

The ability of the advisory groups to function as representative of global public concerns rests on the qualities of their members. Their expertise suggests that they can legitimately represent concerns that arise from their domain of expertise. Their diversity suggests that they embody a range of positions that reflect the world beyond the meeting room of the advisory committee. As Monsanto states in its report on the pledges: "The council is an independent group of leading policy-makers, business people, and experts in diverse fields from around the world." (Monsanto, 2002a: 4).

The two advisory groups operate in localised places from which they are connected through these practices of representation with globally dispersed 'public concerns'. Both DuPont and Monsanto's groups are facilitated by the same NGO, the Keystone Centre. This NGO is based in Colorado and specialises in stakeholder dialogue and conflict resolution. In representations of the advisory group meetings, the Keystone Centre receives only a cursory mention. The meetings do not take place in Colorado, but in Wilmington in the case of DuPont, and Washington, DC, St. Louis, and Brussels in the case of Monsanto. It is, however, intriguing that these two competitors, DuPont and Monsanto, should use the same facilitator for such a strategically significant activity. The role of the facilitator is almost totally erased from the public accounts of the two groups. This again performs the corporation as a coherent actor by rendering invisible all the external consultants, contractors, lawyers, financial advisors and public relations agencies that are required for corporations to operate.

The advisory groups are examples of the proliferation of innovative institutional arrangements that have sprung up in the context of controversies over science and technology. The renegotiation of what expertise is relevant in corporate biotechnology innovation is apparent in the companies' representations of the work of their advisory groups. In the context of the corporations' concern to engage with public controversy over the risks and benefits of biotechnology high status is given to experts who can justify claims to understand public concerns.

Translating 'public concerns' in the dialogue mode of framing

The ways that Monsanto and DuPont stage-manage the performance of their advisory groups indicates the range of public concerns that are brought within the dialogical frame. In other words, these groups operate as institutions in which the constitutional norms of consumer-citizen rights to participate in corporate innovation are being worked out. As the previous section argued, claims of the expert dialogue groups to represent a global public are based on their embodiment of expertise around the table. This section explores the ways that DuPont and Monsanto reveal the range of issues that enter into the groups' deliberations. In doing so, this section discusses the ways that consumer-citizenship is being tacitly configured when the companies engage with questions about "society's acceptance of biotechnology".

In his public discussion of the advisory group, Monsanto's CEO makes an explicit connection between the dialogical processes which the company is institutionalising and constitutional norms of political representation. He claims that the company's future success will depend on its ability to advance "public interests". Monsanto's press release announcing the foundation of its Advisory Council emphasises the importance of the Council's advice to the company's decision-making. Monsanto's CEO, Verfaillie is quoted in the press release as saying:

> "We know that our success as a business and society's acceptance of biotechnology will hinge in part on how well we take account of and contribute to the advancement of broader public interests," said Verfaillie. "We believe sincerely that this biotechnology Advisory Council will foster the dialogue and learning that will positively influence the decisions that direct Monsanto's business."
>
> (Monsanto, 2001a)

The topics discussed by Monsanto's Biotechnology Advisory Council are not revealed by the company. In Monsanto's first Pledge report "Fulfilling Our Pledge" (2002a) no detail is given other than the overarching rationale for the establishment of the Council, the membership of the Council and the number of times it has met. The report restates the objectives of the Council: "The council was formed to help Monsanto leadership more deeply understand and respond to public concerns" (Monsanto, 2002a: 4). In the second of Monsanto's Pledge reports "Commitments to

Our Stakeholders" (2003) three of the ten members are quoted talking about their experience of the Advisory Council. One member mentions discussing Monsanto's policy towards improving the nutritional quality of food and also how the company can increase public transparency through providing information about the environmental effects of agbiotech. But overall there is little indication of the substance of the Advisory Council's deliberations.

The report published by DuPont's Biotechnology Advisory Panel in August 2002 has twelve pages. The first three pages introduce the Panel and its members, the following three pages contain the consensus statement of the Panel, and the final six pages contain personal perspectives of the six Panel members. The subjects discussed in the three pages of the consensus report comprise: the effects of agbiotech on biodiversity; the potential contributions of agbiotech to rural development in the global South; how DuPont can share intellectual property rights over genetic resources; DuPont's strategy for communicating scientific information on safety; and DuPont's commitment to corporate transparency. In comparison with Monsanto, this gives a clearer indication of the topics discussed by the Panel, but there is little detail about the group's conclusions or the processes by which these were reached.

DuPont and Monsanto have used advisory committees to institutionalise a dialogic framing of the companies' relationship with 'public concerns' about biotechnology. However, in the case of DuPont and Monsanto, the global ambitions of their dialogue are achieved through a small number of meetings with between five and ten experts picked by the companies. Both corporations engage in efforts to extend the significance of the localised meetings of the advisory committees through the use of company websites, press releases, documents and speeches. One of the central claims made in the corporate presentations of the work of the committees is the influence that these have on the companies' decision-making. This presentation makes sense within the corporate understanding of controversy over agbiotech as arising from public mistrust in 'unaccountable' multinational corporations.

On DuPont's website, the publication of the Advisory Panel's report (DuPont, 2002a) is accompanied by a series of quotations from six of DuPont's senior executives. These statements can be read as a public performance of the significance that

DuPont's management places on their interactions with the Panel. That these senior figures claim to place great store by their engagement with the Panel is not evidence that the dialogue has directly influenced the decisions that they have taken. But it clearly offers an insight into how DuPont presents its relations to societal concerns over biotechnology. This form of self-presentation as a reflexive and responsive organisation attuned to public concerns offers a new way for DuPont's decisions to be interpreted by a critical public. These quotations are a way that DuPont reveals the backstage processes of its advisory group. By giving these selected accounts of how the company engages with the group, the intimate deliberations of the advisory group are brought into public view.

Paul Tebo, DuPont's Vice President for Safety, Health and Environment, provides the main point of contact for the Panel within DuPont. His statement emphasises two dimensions of DuPont's presentation of the Panel. Firstly, the Panel is designed to help DuPont address the problem of the "acceptance or rejection of biotechnology". And secondly, the Panel has an influence on the company's thinking:

> "Working with the panel continues to re-emphasize the importance of broad stakeholder engagement to ensure diverse viewpoints are brought to bear on the most important issues affecting the acceptance or rejection of biotechnology. The panel has challenged and stretched us and brought thoughtful perspectives to difficult issues." Paul Tebo - Vice President, DuPont Safety, Health and Environment
>
> (DuPont, 2002d)

DuPont's Senior Vice President for Corporate Strategy, Himes, emphasises the importance of the Panel to the company's decision-making process. As if to underline the significance he attaches to the work of the Panel, Himes goes on to testify to his relationship with the Panel members on a personal level:

> "While I'm excited and confident about the potential contributions of biotechnology to mankind, I also respect the need to introduce new science safely. The unique, diverse, global perspectives of our panel members have helped our company, and me personally, see and understand key issues at a very different level. Their insights are an important part of our decision-making process. I can't imagine making an important decision in this arena without fully understanding their perspectives. On a more personal level, I feel privileged to know these men and women who have made such important contributions in their fields." John Himes - Senior Vice President, DuPont Corporate Strategy
>
> (DuPont, 2002d)

The above quotation also serves to highlight DuPont's persistent ambivalence over the status of public concerns. Himes, in this statement, acknowledges not only that stakeholder concerns must be listened to, but that they must also be taken into account when making strategic decisions. However, here Himes uses the term 'safety' to qualify the extent to which societal concerns about biotechnology are legitimate. There is an apparent slippage between the more open language of social acceptance of technology and the narrower reductionist language of risk assessment.

As Terry Medley, Vice President DuPont Nutrition and Health, puts it, the responsibility remains with the company to make decisions over the innovation of biotechnology, but the Panel can serve to offer perspectives and opinions to DuPont that mean the decisions taken are better informed. Here too the range of legitimate positions that the Panel can adopt is limited by Medley's qualification of the views it expresses. There is a sense that the Panel can translate public concerns into a form compatible with DuPont's decision-making process:

> "The panel has done an outstanding job of providing us with a broad spectrum of reasoned views and positions regarding agricultural biotechnology. Through extended dialogue and discussion of critical concerns the panel has assisted in our making the best informed decisions. In sum, the very wide and diverse expertise of our panel and their willingness to share has proven invaluable in making development decisions about agricultural applications of an enabling technology." Terry Medley - Vice President, DuPont Nutrition and Health
>
> (DuPont, 2002d)

Similarly, throughout Monsanto's reporting on the work of its Advisory Council it emphasises the influence of its work on the company's decision-making. The section in Monsanto's first Pledge report (2002a) that deals with the 'Dialogue Pledge' quotes Monsanto's CEO. He affirms the seriousness with which he takes the Council's deliberations:

> The council makes all its recommendations directly to Monsanto President and Chief Executive Officer Hendrik Verfaillie, who chairs the council. "We know that our success as a business and society's acceptance of biotechnology will hinge in part on how well we take account of and contribute to the advancement of broader public interests," Verfaillie explains.
>
> (Monsanto 2002a: 4)

The insistence on the part of DuPont and Monsanto that they are not only listening to their advisory committees but are also acting on the advice pre-empts the potential criticism that all this talk of dialogue is merely 'window-dressing'. The performances of the backstage processes are vital if this institutionalisation of dialogue is to succeed in enabling the corporations to claim to be pursing the public interest. This is illustrated by Monsanto's Vice President for Public Policy, Kate Fish, in her presentation to the conference on 'Ethical Values': "real changes by industry are required: its not just about communication" (Fish, 2002, page 14).

The desire by the two companies to publicise the internal workings of their institutionalisation of dialogue results in a paradox. The necessary negotiations among the representatives of different interests require a certain amount of privacy according to one of Monsanto's UK managers. In an interview with me he described his experience of the implementation of Monsanto's 'Dialogue' pledge in terms of the company communicating what it was already doing:

> We were doing a lot of dialogue, as I explained. A lot of dialogue has to be, by its very nature, out of the public eye because some of the people that we want to talk to – to try and resolve our differences – probably don't want to talk to us initially... we wanted to make it absolutely clear that when people said the problem is that they [Monsanto] don't talk to the right people – they don't talk to everybody, we wanted to make sure that it was very clear that we do.
>
> (Anon., interview, 7 October 2002)

However the commitment to demonstrate corporate dialogue results in the many different representations of the workings of the advisory groups. Both DuPont's Panel report and Monsanto's second Pledge report contain comments from committee members on their experience of taking part in dialogue with the companies. The consensus statement which forms part of the DuPont report records the members' feelings about the processes under the heading "DuPont is clearly very committed to this process":[29]

> We have each been part of advisory panels that have proven to be ineffectual, or that were convened for the purposes of paying lip service to stakeholder

[29] The use of the word "ultimately" possibly hints at earlier doubt in the minds of some of the members as to the effectiveness of the Panel.

> involvement, or hoping that panel members would "rubber stamp" particular practices and policies. Ultimately, we have found none of these to be the case with the DuPont Biotechnology Advisory Panel.
>
> (DuPont, 2002a: 4)

On a more positive note the Panel then goes on to say:

> DuPont has been open in sharing information regarding product development, as well as policies that are in the formative stages, and thus the Panel has maximum potential to influence direction.
>
> (DuPont, 2002a: 4)

Just as representations of the membership of the stakeholder dialogue initiatives illustrate tensions in defining the *public* in 'public concern', so representation of the topics of the dialogues demonstrates the tensions in defining the *concerns*. The premise of these initiatives is that corporations must pay greater attention to a wider range of perspectives in order to manage the social acceptance of their innovations. A critical element of this strategy is to take public concerns seriously; that is, not to assume that they are illegitimate just because they are not based on scientific knowledge.

The challenge that is presented to the corporations is how to handle a wide range of points of view about biotechnology, particularly when some of those views are inconsistent with science-based risk assessment as understood by the corporations. One approach that is partially adopted by both DuPont and Monsanto is to mark a distinction between scientific facts about the safety of the technology and public opinions about its acceptability. One way that this distinction is achieved is by introducing the notion of ethics, and ethical concerns. This is illustrated by the presence on DuPont's Council of a professor of bioethics. Also, on the DuPont biotechnology website, there is a fact sheet about 'Ethics and Biotech' in which societal concerns are framed in terms of ethical objections:

> DuPont recognizes that there are questions about the practice of biotechnology rooted in ethical and religious values. Some feel society is overstepping its bounds when it uses biotechnology. Others, based on their ethical and religious values, believe biotechnology is just another step forward in a long line of advances in medicine and in agricultural science.
>
> (DuPont, 2002c)

DuPont's website elides questions of public participation in the governance of the companies' biotechnology research with questions of ethics. In addressing the question of how it will ensure that its research is carried out ethically, the DuPont website points to the existence of the Advisory Panel:

> Ethics
> 1) How will DuPont determine that its biotechnology research is conducted in an ethical way?
>
> We have made a public commitment to be open and transparent. We routinely consult with biotechnology's critics and proponents about the development of biotechnology products and we make key safety information available to the public. We also have formed an independent panel to guide our actions, help us consider and address important issues, and guide and challenge us in the development, testing, and commercialization of new products based on biotechnology. The advisory panel will audit the progress DuPont makes and provide regular public reports.
>
> (DuPont, 2002j)

As Brian Wynne has since argued, the introduction of ethical discourse can serve to marginalise public concerns to questions of how new technologies are applied in society, rather than opening up the industrial innovation process itself to outside criticism (Wynne, 2001). Wynne's position is particularly relevant to consideration of the institutionalisation of dialogue at DuPont and Monsanto given his involvement with parallel moves by Unilever, which are explored in the next section. The classification of dialogue as a form of ethical instrument has implications for which topics are subject to stakeholder dialogue about GM foods. Given the companies' understanding of ethical problems in terms of an individual's value judgement, this re-makes distinctions between facts and values. Facts can be established by experts working in the appropriately sanctioned institutions, and values are open to wider public debate. Thus in each of the cases of the advisory groups to DuPont and Monsanto there appears to be some move to distinguish between questions of safety, which are the preserve of scientists working for the companies and regulatory agencies, and questions of public concerns of the ethical implications of the technology.

However, just as Wynne has been one of those whose research has been used as part of Unilever's dialogue process, so other corporate actors are aware of the potential dangers of engaging with stakeholders and yet marginalising their contributions as

unscientific. In the presentation given by Monsanto's Vice President for Public Policy in Belgium she ended with this quotation taken from the journal *Nature Biotechnology:*

> "Biotechnology's future ultimately relies on governing institutions listening and responding to the public, rather than discounting key stakeholders as irrational, scientifically illiterate, or technophobic."
>
> (*Nature Biotechnology*, January 2000, quoted in Fish, 2002: 24)

Given the ways that DuPont and Monsanto have reported the work of their advisory groups it is impossible to know how the discussions have treated the detailed questions around GM technology. From the public performance of these initiatives it is possible to trace the tensions that exist between marginalising a range of concerns that fall outside the risk-assessment models of regulation, and a more open dialogue. The very fact of this tension opens up new spaces for political action and reflection on the governance of corporate biotechnology innovation. The performance of the backstage processes by which public concerns are taken account of by senior managers at DuPont and Monsanto is a moment in the cyclical configuration of consumer-citizenship rights. Once the norm of a right to be heard in corporate innovation becomes established, however tentatively, it adds to the elements of a wider constitutional upheaval over the governance of science and technology.

4.4 Institutionalising NGO dialogue at Unilever: configuring consumer-citizens

The context for the institutionalisation of dialogue initiatives at DuPont, Monsanto and Unilever is the European public controversy over the introduction of GM foods. The companies' presentation of these initiatives – as efforts to rebuild public trust in corporate technological innovation – is an ambitious and rather slippery goal. One major problem with this formulation is that societies have changed to such a degree that it is hard to imagine a return to a past in which public trust in corporate innovation was high, if such a situation ever existed at all. Changes in the way that society is experienced by the corporations are summarised by what Monsanto calls the shift away from a 'trust me' society, through a 'show me' society, to an 'include me' society.

In the previous section I have discussed the ways that the dialogue initiatives of DuPont and Monsanto have been presented as promoting the social acceptance of GM technologies. In this section I explore in more detail how Unilever began to grapple with the implications of acknowledging citizen-like concerns of its consumers regarding the technological innovations underlying the company's products. The case of Unilever's NGO dialogue is presented separately from the advisory groups of DuPont and Monsanto in part because the depth of the empirical material I have is greater. This is linked to the fact that Unilever's formal engagement with NGOs over the GM public controversy has taken place over a longer duration. It is therefore possible to discuss how the process has changed over time. The Unilever case also allows me to develop this chapter's thematic concern with the dialogue mode of framing through following the collaboration between NGOs, Unilever and academic social scientists to explore public attitudes to GM foods. It is in this case study that the category of consumer-citizenship in most explicitly developed. This section is able to follow the tensions that have accompanied the institutionalising of the concept of consumer-citizenship through the hybrid space of Unilever's NGO dialogue group.

Unilever developed this hybrid space through engaging with environmental and consumer NGOs in the UK since 1994, when the company formed an 'NGO Contact Group' (see Table 4.1). As far as participants in the Contact Group were concerned, the most valuable part of their discussions was commissioning social science research to explore more about public attitudes to biotechnology. One of Unilever's principal members of the Contact Group put it like this:

> We were very fortunate to find a common interest with the Green Alliance and members of the NGO contact group: to understand better what was going on, particularly from the perspective of the public as consumers and citizens, and to invest time and effort to put up the questions and hypotheses for deeper study.
>
> (Schofield, interview, 8 October 2002)

In 1994 Unilever and the environmental NGO, Green Alliance,[30] co-hosted a seminar in London to which NGOs representing a wide range of consumer and environmental interests were invited. Following this event, Unilever and the Green Alliance

[30] Green Alliance is a London-based environmental NGO that had developed a reputation in the 1980s for building consensus on environmental issues with government and business.

established a small but open 'Contact Group' between representatives from the firm and NGOs. The Contact Group held ad hoc meetings at intervals of about six months over the next seven years to discuss issues concerning the development, regulation and commercialisation of GM technologies. The Contact Group operated informally, and close working relations developed between Unilever and the British NGO community over the issue of GM foods, lasting beyond the group's final meeting in the summer of 2001. Through contacts made during the 'NGO dialogue', Unilever also sponsored three pieces of academic social science research on biotechnology. Within Unilever, the Contact Group became an important mechanism for incorporating a wider range of perspectives in the company's reflections on the development and commercialisation of GM foods. The interaction with social scientists helped some people within Unilever to reframe the way that the company conceptualised public attitudes to innovation. This reframing was also used within the company to consider public attitudes to the social and environmental implications of corporate practice.

Unilever's NGO dialogue over GM foods was used by the company to respond to a controversy that could not be adequately managed within the corporation's established models of market research, product development, government affairs, and public relations. Unilever participants in the NGO dialogue began to use the terms 'consumer-as-citizen' or 'consumer-citizen' to describe public attitudes to GM foods that could not be captured in terms of consumer preferences alone. According to this understanding, Unilever believes it needs to take account of citizen-like expressions on the part of consumers toward the technologies used in its products, and also toward the corporation itself.

The term consumer-citizen has been discussed in detail in Chapter 2. The politicisation of the act of consumption captured by the term 'consumer-citizen' is similar but different from the concept of 'citizen-consumer', which expresses the increasing marketisation of political relations (Iles, 2004). The term 'consumer-citizen' is one that takes the corporation as its analytical starting point. Unilever's NGO dialogue provides an opportunity to study the emergence of the category of 'consumer-citizen' as it opens up a new domain in which citizenship rights are negotiated in relation to a private body rather than the state.

As Unilever tried to cope with public controversy over GM technologies in the UK it extended the meaning of citizenship beyond its traditional political definition. Unilever's engagement with NGOs, and its subsequent commissioning of social science research into public attitudes to GM foods, can be understood as attempts to reframe the company's relationship with its publics in three ways. First, this reframing led Unilever to introduce the category of 'consumer-citizen' to capture the complex relationships between a multinational corporation and its publics. Second, in order to frame public attitudes in these terms, Unilever needed to institute techniques to aggregate and represent public attitudes; in doing this, the company became embedded in networks of NGO and academic practice. Third, tensions became apparent in the term 'consumer-citizen', indicating that the company's institutionalisation of practices to take account of consumers' citizen-like expressions is necessarily incomplete and open to challenge from outside the company. The remainder of this section is organised by considering in turn each of these moments of reframing.

NGO dialogue as a hybrid forum

Unilever is a large multinational consumer goods producer, with a turnover of 49 billion Euros in 2002, and headquarters in the Netherlands and the UK (Unilever, 2003). Unilever's business is divided into two groups: 'home and personal care', which includes shampoos, soaps and detergents, and 'foods'. Since the early 1980s Unilever has invested in agricultural biotechnology research and, in the first years of the 1990s, was collaborating in the development of GM tomatoes for processing in sauces.[31] However, it is as a producer of processed foods, using large quantities of commodity crops such as soya in a wide range of products, that Unilever became most concerned with the potential problems of commercialising GM technology.

Knowing that shipments of GM soy would arrive in 1996, Unilever worked with other companies through industry forums to develop a strategy of labelling when the presence of GM soy could be measured through DNA testing. Nevertheless, when the

[31] Unilever pulled out of the research before the product was commercialised as tinned tomato puree in 1996 (Doubleday, 1999).

first shipments of GM soybeans arrived in Europe from North America in the autumn of 1996, Unilever was among the companies targeted by environmental activists in a campaign against the commercialisation of GM foods. Greenpeace protesters demonstrated outside the company's offices in Hamburg and London (Independent, 1996a; 1996b). Unilever's action to label its products did not silence its critics. Retailers in the UK were also experiencing activist pressure, and when some major retailers announced an intention to stop using GM ingredients during the spring of 1999, Unilever was also forced by public pressure to announce that it would remove GM ingredients from its food products sold in the UK and afterwards the rest of Europe (Nuttall, 1999). Public controversy over GM foods in Europe presented the company with a significant challenge to its commercial strategy.

For corporations making decisions about research and development, any calculation of the consequences of different options has to rest on assumptions about actors' future behaviour. In the case of Unilever's biotechnology research strategy in the late 1980s and early 1990s, the consumer was an economic actor who appeared at the end of a long series of technical trials. Research was framed so as to identify the qualities of the GM technology that would allow ripe tomatoes to stay firmer and therefore reduce wastage in harvesting, transportation and processing. The frame included a role for the farmers, the seed company, the mode of transport and the processing technology, with only a secondary role for a price-conscious consumer (Doubleday, 1999). Unilever's NGO dialogue in the UK during the 1990s was a recognition that in addition to price and quality preferences consumers also had an interest in the technology being used. The Contact Group was a hybrid forum containing NGOs, who were new actors in the company's decision-making frame. This forum was used by people within Unilever in a strategy for anticipating public attitudes to the social and environmental dimensions of new technologies.

By reframing 'consumers' as 'consumer-citizens', Unilever attempted to cool the GM controversy in the UK and contain the overflows of societal concern. Yet this framing brought with it a series of tensions and questions that Unilever was unable to resolve neatly in its construction of the 'consumer-citizen'. Using interviews that I carried out with participants in Unilever's NGO dialogue, I illustrate the process of reframing and its implications.

Unilever's NGO Contact Group

Unilever's NGO dialogue on GM began in November 1994 with a one day seminar jointly organised in London with the Green Alliance. NGOs were invited to hear presentations by representatives from the company about its GM technology strategy and to discuss their concerns about the commercialisation of GM foods. The initiative was set up by two people who worked for Unilever, UK. Christine Drury, who has a background in marketing and has worked in environmental management, and Geraldine Schofield who has worked as a research scientist and was by the early 1990s heavily involved in regulatory affairs on the foods side of Unilever's business. Drury had experienced controversy over biotechnology during the 1980s when the detergent industry's use of GM bacteria to produce novel enzymes for detergents sparked a public debate in Germany. In response to objections about the industrial application of GM technology a series of industry/NGO workshops had been held to discuss possible ways of defusing the controversy. Unilever had also led parallel discussions in the Netherlands on GM food applications. Drury's experience in Germany and the Netherlands led her to believe that dialogue with NGOs was a useful way for Unilever to respond to potential controversy over new technologies. Given the company's investment throughout the 1980s in GM technology research, Drury, with Unilever colleagues in UK and the Netherlands, advocated NGO dialogue over the commercialisation of GM foods:

> We said "look, we've got all these things in the pipeline, this is a technology that is controversial, it's really important that we engage with broader society and broader societal groups". The origin of the Contact Group was to say, "let's start that debate".
>
> (Drury, interview, 7 October 2002)

Schofield attributes the impetus for setting up the Contact Group to a sense of uncertainty about how Unilever should handle the problem of incorporating GM ingredients into its food products. Schofield's sense of Unilever's uncertainty is significant given her close involvement with the regulation of novel foods. Schofield worked at Unilever's central laboratory for food research and was a member of the UK government's scientific committee advising on the commercialisation of GM crops (Advisory Committee on Releases to the Environment). Unilever's turn to

NGOs in 1994 suggests that its product development strategies and the UK government's risk assessment regulations were not successfully framing the introduction of GM technology because of a failure to take sufficient account of important aspects of public concern. The origin of the NGO dialogue is explained by Schofield as Unilever's attempt to reframe the commercialisation of GM foods as a problem with important public dimensions, and in which NGOs must be seen as significant actors:

> We would be faced with a genetically modified commodity crop and the question was, "how are we going to handle this?" because at the end of the day we are the ones who are going to be incorporating this into food that we sell, and so what are we going to do?
>
> (Schofield, interview, 8 October 2002)

The initial one-day seminar in 1994 organised by Unilever and the Green Alliance included groups such as the World Wildlife Fund (WWF), Greenpeace, Friends of the Earth, Genetics Forum, Consumers' Association and the Women's Institute. The Contact Group grew informally out of this first meeting. Members of this group initially included several people from Unilever, including Drury and Schofield, a consultant, Dorothy Mackenzie who worked as the group's facilitator, and representatives from the environmental network drawn together by the Green Alliance. The meetings were jointly chaired by Drury from Unilever and Julie Hill from Green Alliance. Membership of the group was loose, people were invited to take part and any representative of an NGO that expressed an interest was invited to join the group. Attendance at meetings fluctuated depending on the issues being discussed and the level of wider interest in GM foods at the time of the meeting. At some points more senior managers from Unilever would join the discussions. The small scale of the Contact Group meant that members developed close working relationships. Participants in the dialogue have talked positively about the greater understanding that evolved between NGOs and Unilever over their respective positions towards GM technologies.

The Contact Group provided a mechanism for Unilever to incorporate NGO perspectives on GM into the company's business planning. The ability of the corporation as a whole to learn from the dialogue with NGOs depended on the ease

with which the Unilever participants could communicate their experience of the Contact Group to the rest of the business. Schofield suggests that the NGO dialogue provided her with the opportunity to address audiences within the company about biotechnology, its advantages and the challenges confronting its commercialisation:

> We took the learning from that NGO Contact Group and we had an internal Unilever presentation for the business, particularly marketing people, as to why Unilever was interested in biotechnology. That must have been '95 because we felt at that point, quite a few of us, that the sharp end of Unilever, the marketing people and some of the sort of front-end supply chain people, were less aware of the debate about biotechnology and about, what could happen, and what they might be faced with.
>
> (Schofield, interview 8 October 2002)

As Unilever struggled to make sense of public issues surrounding the introduction of GM technologies, the Contact Group provided a hybrid forum where consideration of environmental and public interests as well as business strategy, consumer preferences, government policy, civil society, and public attitudes was possible. Discussions within the Contact Group took place in confidence,[32] which partially insulated the group from the heat building up in public arenas in the UK over GM policy during 1996. This is the same tension that was observed in the case of the advisory groups of DuPont and Monsanto. Drury attributes great importance to the establishment of trusting relations among members of the group:

> You engage by understanding, being open about what a business can do and trying to find a way forward, where you are transparent about what the limits and the possibilities are, rather than creating a defensive screen.
>
> (Drury, interview, 7 October 2002)

This view was shared by NGO members of the Contact Group. One environmental NGO participant talks about the relationship she developed with people from Unilever as one of the chief successes of the Group:

> What was so interestingly good and refreshing about the [Contact Group was that] you genuinely learned, and of course the relationships that you establish. I mean now I can go and see [Schofield] at Unilever and say, "Oh God, what do you guys

[32] The Contact Group adopted the "Chatham House Rule", according to which members could speak without having what they said publicly attributed to them.

> think about the labelling?" I can be very open and have trust about those sorts of things. From industry's point of view they would do better to do more of that, and from our point of view it's good because we get to understand industry's thinking.
> (Interview, 14 June 2002)

Through good relations in the Contact Group Unilever was able to add new perspectives to its internal deliberations over questions raised by the commercialisation of GM foods. The company had found itself caught between Monsanto's apparently successful commercialisation of commodity GM crops in North America and carnivalesque protests outside Unilever's European headquarters, which threatened the company's image as much as it disrupted Unilever's plans for marketing GM foods. In this context Unilever engaged with NGOs as new interlocutors brought together in the hybrid forum of the Contact Group. Questions such as uncertainty over the ecological impacts of introducing GM crops, and consumer attitudes to labelling and choice were discussed in the safe environment of the Contact Group.

Framing the 'consumer-citizen'

The first line of Unilever's much repeated mission statement reads "our purpose in Unilever is to meet the everyday needs of people everywhere". Given Unilever's pride in being responsive to its consumers, uncertainty about public reactions to GM technology was unsettling to people within the company. NGOs such as Greenpeace and the Consumers' Association were seen by Unilever representatives in the Contact Group as having a different understanding of the potential public arguments about GM than existed in the company. The NGO Contact Group had developed out of a mutual curiosity between Unilever and NGO groups. However, members found it difficult to get beyond discussing different positions towards GM foods, and they were unable to reach any consensus about what was at stake over the commercialisation of GM technologies. This notwithstanding the group found that members had a common interest in exploring public attitudes to GM foods. Unilever was interested in what its consumers thought, and both environmental and consumer NGOs believed that public attitudes towards GM foods would be important in future debates about the appropriate regulation of GM. An important topic discussed by the

group was the issue of labelling GM foods; this debate also served to raise the significance of the public as consumer and provided an important common ground between the firm and the NGOs.[33]

By addressing the question of public attitudes, the Contact Group side-stepped a potential failure to reach consensus over how GM foods should be regulated. One environmental NGO member of the Contact Group comments about the interest that returned once the Group began to explore the possibility of commissioning academic social science research into public attitudes:

> I think we'd decided by then that the Dutch model of trying to reach a consensus with the company had got so bogged down... we needed a different rationale, but if the meetings were to continue to be worthwhile and interesting, there needed to be something else going on. So these notions of using Unilever money and company insight to explore views with these social science perspectives grew out of that, and then the NGO Group became almost a reference group for that work. That's when I remember getting really interested, in '96, '97.
>
> (Interview, 29 October 2002)

In consultation with the Contact Group, Unilever sponsored three pieces of social science research. Initial contacts were made with Professor Robin Grove-White of Lancaster University's Centre for the Study of Environmental Change. Grove-White was known personally to environmentalist members of the Contact Group through his position as Chair of the Board of Greenpeace UK. The Centre for the Study of Environmental Change had developed methodologies for studying public attitudes to technological and environmental risks, which it applied in research for the first report commissioned through the Contact Group: *Uncertain World: Genetically Modified Organisms, Food and Public Attitudes in Britain.*

All three reports came out of Unilever's work with the Contact Group, of which two were commissioned from researchers at Lancaster University: *Uncertain World*, (Grove-White *et al.*, 1997) and *Wising Up*, (Grove-White *et al.*, 2000). One report, *Rethinking Risk* (Stirling and Mayer, 1999), carried out at the Science Policy Research Unit, University of Sussex, explored the range of expert opinions on the risks and

[33] See Mikael Klintman (2002) on the alliance between consumer and environmental NGOs on the importance of labelling GM foods.

regulation of agricultural biotechnology in the UK. Of the three reports the first, *Uncertain World*, dealing with public attitudes to GM foods, was referred to most often in my interviews with members of the Contact Group when they talked about the impact of their work on debates over GM policy within Unilever and beyond. That report was launched in March 1997 to coincide with the 'National Biotechnology Conference' organised by the UK government.

The research for *Uncertain World* explored public attitudes to GM foods using nine focus group discussions. The focus groups were held in November and December 1996 in Lancashire, northern England, and London. The groups were organised by gender, social class and age, as illustrated by this description of one of the groups: "Non-Working Mothers, aged between 30-40, living in north London... socio-economic class B" (Grove-White *et al.*, 1997: 61).

The focus groups were encouraged to discuss the context for their attitudes to GM foods, such as questions of biotechnology more generally and the regulation of technological risks. A key finding of the report was that public attitudes to GM technology could best be described as ambivalent. While the focus group discussions suggested that the public in the UK was not against GM technology *per se*, the research highlighted public unease about the adequacy of regulatory oversight. The report concluded that public mistrust of the existing regulation of GM technologies should be understood in the context of a wider sense that citizens' views were being ignored by government and industry, who appeared over-confident in the established regulatory system. The report recommended experiments with new institutional forms that would allow public deliberation on the overall trajectory of biotechnology innovation.

In the context of the Contact Group, the report's analysis of public ambivalence in terms of the poor quality of public space for the discussion of new technologies was particularly significant. The report found that the focus groups evaluated GM foods using multiple 'planes of reflection', the most significant being the planes of 'consumer' and 'citizen'. The report commented on British public attitudes to GM foods in terms of the tensions caused due to the lack public space for discussing issues relating to the 'citizen' plane:

> It may well be that an absence of public fora in which the broader social implications of *biotechnology* (i.e. on the 'citizen' plane) have been, or might be explored in open-ended fashion is leading individuals or groups with such concerns to focus attention, in 'protest' mode, on the particular products which are the technology's only current physical manifestations (i.e. apparently at the 'consumer' plane). Such individuals may thus *appear* to be investing *particular* products with the disturbing potentialities actually sensed in the technology *as a whole.*
>
> (Grove-White *et al.*, 1997: 18, emphasis as in the original)

For their part, Unilever representatives in the NGO dialogue were keen to use the Contact Group to develop a broader understanding of public attitudes to GM foods. They justified the academic research they had sponsored to other colleagues in terms of getting a better understanding of consumers, and developing methodologies to incorporate these understandings into Unilever's innovation strategy. What was novel about this approach was that the concerns of the public as citizens were solicited using methodology developed by social scientists interested in wide-ranging questions of the politics of science and technology. Drury and Schofield also promoted the work of the Contact Group within Unilever by arguing that consumer attitudes to technology could have important commercial implications that would have to be taken into account when making decisions about research and development priorities. In the following quote, Drury describes how she presented the research report *Uncertain World* (Grove-White *et al.*, 1997) to sceptical colleagues at Unilever:

> Look, absolutely rock bottom, Unilever is about understanding consumers, this [report offers] some deep insights into some latent concerns that consumers have... [The GM issue] was really only just beginning to emerge, but if we are truly going to understand what might come down the road in terms of the future, when these things become visible for consumers, then this is about, if you like, foresight research.
>
> (Drury, interview, 7 October 2002)

When it came to institutionalising the experience and research of the Contact Group within Unilever the concepts and methods of researching the 'consumer-citizen' were also woven into a wider concern with 'Corporate Social Responsibility'. This is now an important agenda for Unilever as a whole. The NGO Contact Group's work on GM foods, and the research on 'consumer-citizens', is credited by Drury as having a formative influence on Unilever's understanding of 'Corporate Social Responsibility':

> In Unilever strategic terms there is an important part of connecting with consumers, which is connecting with consumers in society, consumers as citizens, and leaping right forward to the world we're living in today, corporate social responsibility and all of these agendas... It's now much easier than it would have been if we hadn't done that work to say, yes there is a thread of consumer interest and concern which we need to understand, as much as we need to understand if people want a curry version or a mild version of a product. "What kind of life do I want to live?" and "Where does it [the food product] come from, how is it made, what's in it?"
>
> All of those agendas people [in Unilever] are now familiar with because of the research context of the work that we'd set up, and the different kinds of market research and focus groups based on sociological understandings.
>
> (Drury, interview, 7 October 2002)

As Drury notes, the theoretical and methodological insights of the report *Uncertain World* provided additional tools for people in Unilever to understand how the company's consumers might relate to Unilever as citizens. This reframing depended upon an alliance of NGO, Unilever and academic interests through the hybrid forum of the Contact Group. The institutionalisations of dialogue at all three companies depend on the representations of consumer-citizens. However the use of social science research to construct representations of public attitudes which are brought into the hybrid space of the dialogue group is particular to the Unilever case. For both DuPont and Monsanto the groups' claims to represent public concerns rested on the embodied expertise and diversity of the group. Whereas in the case of Unilever this was augmented with focus group methodologies for exploring a range of British public attitudes to biotechnology. This section now goes on to explore how the framing of the public as consumer-citizens was unevenly institutionalised within Unilever.

Tensions inherent in corporate framings of the 'consumer-citizen'

The category of 'consumer-citizen' has developed at Unilever as a term that expresses the ways that publics relate to the company in ways other than as economic consumers of its products. According to Drury the research carried out through the Contact Group has contributed to Unilever's framing of 'consumer-citizen' using "different kinds of market research and focus groups based on sociological understandings".

Unilever members of the Contact Group talk about 'consumer-citizens' as a way of expressing the tensions that exist between 'consumer' and 'citizen' elements of public reasoning. One of the challenges that Drury and Scofield encountered in trying to institutionalise insights from the Contact Group was the apparent contradiction between openness to engaging with citizen perspectives implied by the concept of 'consumer-citizen', and the imperatives of a corporation operating at a global scale. Unilever is familiar with these contradictions, and an often repeated catch-phrase used within the company is that it is a 'multi-local multinational'. This tag suggests that Unilever can capture both the benefits of global scale (such as reduced costs) *and* the benefits of proximity to local markets (through tailoring products to local tastes). Yet Schofield describes the tensions that are faced when translating the experience of the Contact Group in the United Kingdom for the company globally as particularly acute.

In the quotation from my interview with Schofield there is a sense of uncertainty about the scale at which the concept of 'consumer-citizen' is operationally useful. The financial management of Unilever and its relations to shareholders through stock exchanges in Amsterdam, London, New York, (and also Belgium, France, Germany, Luxembourg and Switzerland) are structured 'globally'. Marketing strategies are developed for a particular market, the scale of which depends on the product and its brand. Likewise, the management of the supply-chain which combines the sourcing, production and distribution of products is organised on a scale dependent on the relationship between the processing technologies and the market. How the category of 'consumer-citizen' relates to the existing range of scales operating within Unilever has been an important question for Schofield and Drury as they have tried to institutionalise the lessons of the Contact Group:

> One of the things that we were saying about this consumer-citizen thing, is that whatever we develop for the business, it has to be a model because it has to be applicable across different cultures, there's no point in having a model that is only applicable to Europe. With such a business as we have, we have an economic accounting system in Unilever which is universal, whether you're in China, Brazil or Australia, it's the same model basically. We need something which is translatable, which managers can recognise and tools that they can use.
>
> (Schofield, interview, 8 October 2002)

Not only is there a tension arising from the problem of scaling up the institutionalisation of 'consumer-citizen' but also from different interpretations of the work of the Contact Group within Unilever. At the time that *Uncertain World* was published in March 1997 there was a division of opinion within the corporation about how best to respond to the questions posed by the commercialisation of GM crops:

> After *Uncertain World* we hiccuped a little bit because it was such a big thing. We weren't quite sure where to go next, as there were differing views in Unilever about whether this was a helpful piece of work. It was seen strictly as a piece of UK work initially without wider relevance.
>
> (Schofield, interview, 8 October 2002)

After the public controversy over GM foods had increased to the point of becoming a national political crisis in the UK during the latter part of 1998 and into 1999, more senior management within Unilever began to appreciate the relevance of the work of the Contact Group. According to Schofield, *Uncertain World* was suddenly regarded within Unilever as a useful contribution to a difficult debate. Drury found that she was able to justify the NGO dialogue to sceptical colleagues in terms of its ability to continue to engage with NGO critics through a difficult period:

> In a sense what we created was, I don't regard it this way because I regard it as fundamentally changing the way people think, but if you look at it operationally what we were doing, then many people would have said "The Contact Group is creating a very good buffer zone, where Unilever is being seen as part of the solution more than it's part of the problem", which helped the rest of the business to make the necessary adjustments that it needed to make operationally, in order to come in line with the rest of society and where consumers really were.
>
> (Drury, interview, 7 October 2002)

Unilever's partial institutionalisation of the work of the Contact Group has also aroused tensions among NGO members of the Group. There is a sense of frustration among some members of the Contact Group that it is not possible to see how Unilever has taken on board understandings of consumers as citizens. In an interview, one member explains the gradual winding down of the Contact Group as arising in part from these frustrations:

> I think we did lose a bit of momentum, I'm not sure why, maybe just sort of general exhaustion, maybe I think realisation that Unilever policy wasn't necessarily changing greatly, well not being able to see how any of this fantastically interesting, exciting social research related to Unilever's behaviour, and that maybe that they didn't choose to expose it very much. [Christine Drury] always talked very openly about the effect it's having on the company, but we only see her, I'm not saying she's right or wrong but you've got no further evidence of it.
>
> (Environmental NGO member, interview, 29 October 2002)

From the point of view of the academic researchers the tensions within Unilever were sometimes all too visible. Robin Grove-White, along with the other academics involved with work funded by Unilever through the Contact Group, speaks very highly of the way that Drury and Schofield managed the commissioning of the research and their respect for academic independence. But, whereas Drury and Schofield were keen to engage with the findings of the research, others at Unilever did not always respond so favourably:

> I remember at the Greenpeace Business Conference in 1997... I spoke about *Uncertain World* and I talked in public, as a board member of Greenpeace to an industrial audience about how honourably they [Unilever] had behaved. Immediately following that the Head of Unilever UK spoke, who made it absolutely plain that he didn't agree with it... He thought GM should go ahead whatever people thought was good for them.
>
> (Robin Grove-White, interview, 3 October 2002)

The concept of 'consumer-citizens' as a new category in sophisticated market research was given a high profile in a speech by Unilever's co-chairman, Niall FitzGerald, when he opened a new biosciences laboratory in 2000. The speech, "Biosciences: Building a better future for consumers", deals with the damage that public mistrust in science can do to offset the benefits that Unilever can offer to its consumers through further innovation. Unilever's response, the speaker indicated, was to promote trust through greater corporate 'openness and transparency'. FitzGerald cites as evidence the research carried out at Lancaster University as part of the NGO dialogue:

> This means businesses like ours have a major responsibility to assist in the rebuilding of trust and confidence in innovation and new technology. Our commitment to achieving this through dialogue has been demonstrated repeatedly, not least by our participation with Lancaster University in the 'Uncertain World'

> research into public attitudes to GMOs. This work has underlined the importance of connecting with people as both consumers and citizens.
>
> (Niall FitzGerald, 2000a)

FitzGerald immediately goes on in his speech to interpret the concept of dialogue with people as consumers and citizens in an instrumental way that aims to market existing products more successfully. *Uncertain World* had sought to open up the culture of corporations like Unilever to reflect the wider social dimensions of technological innovation, and the report had concluded that public spaces needed to be developed in order to allow public deliberation over the innovation of new technologies. FitzGerald narrowed this understanding to a programme of improved public relations:

> As I see it, the key point is that people do not want to be sold some fancy technology. In fact, the technology itself may be a turn-off. Instead, what they will buy are real, practical benefits for themselves in their daily lives. These have to be communicated in the right way, as part of a continuing dialogue. What is needed is a policy of 'generous listening', so we can build up an understanding of how this technology fits into people's lives, and be sensitive to how they approach and perceive it.
>
> (Niall FitzGerald, 2000a)

If public trust in the corporation is to be earned through demonstrations of openness and transparency, then Unilever requires audiences in front of whom its openness can be demonstrated. In the context of controversies over new technologies these demonstrations of openness require audiences familiar enough with the topics to be able to credibly attest to the processes of NGO dialogue and academic social science research. As Head of food regulatory affairs in the UK, Geraldine Schofield speaks for Unilever about the NGO dialogue to a wide range of audiences, including some that can be expected to be sophisticated judges of such 'science and society' activities. In a keynote speech at a science communication conference held by the British Association for the Advancement of Science, Schofield expressed Unilever's understanding of the implications of opening up its innovation process to public deliberation by engaging consumers as citizens:

> One possible conclusion from this series of work in the UK, so far, is to focus not on the products in the first instance, however attractive their "benefit set", but on understanding and helping, with others and institutionally, to build a *space* within which consumers will be keen to evaluate new ideas and assess their benefits and also their risks. A key criterion being that this should be genuinely a public space,

> and not owned by any particular group, and that the nature of the space will evolve to reflect developments in the risk environment.
>
> (Schofield, *Engaging in Dialogue with NGOs,* 30 May 2002)

Schofield is not only calling for a public space for the evaluation of new technologies, but in making this speech, she is also directly engaging with audiences outside Unilever. The implications of including the 'consumer-citizen' within Unilever's product development frame include having to enrol wider public interest groups in the company's decision-making processes. The contrast between the implications Schofield draws from the Contact Group work and FitzGerald's instrumental use of 'dialogue' to sell technological advances demonstrates a difference of perspectives on Unilever's adoption of the learning from the NGO dialogue. This apparent inconsistency reiterates the complex character of the 'consumer-citizen' frame. Although these tensions are not explicit in the materials produced by performances of DuPont and Monsanto as dialogical companies, similar tensions are implicit in the ways that they frame publics as consumer-citizens in relation to corporate innovation.

4.6 Conclusions

This chapter has argued that 'dialogue' has become important to corporations as a mode of framing their relations with publics over GM foods. It has examined the roles of the CEOs of DuPont, Monsanto and Unilever in complex performances of corporate openness to public perspectives on technological decision-making. The chapter then went on to explore in more detail how the three companies have taken steps to institutionalise dialogue as part of a sustained performance that re-makes the boundaries of the corporation. In each case the companies open up, albeit only very tentatively, internal processes of decision-making to public discussion. All three companies have institutionalised dialogue in instrumental ways, designed to ease the social acceptance of agbiotech products. However, this chapter argues that in doing so new political opportunities are opened up.

In the case of DuPont and Monsanto, the ways that the companies publicly report their dialogue groups raises questions about the scope of these initiatives. The ability to ask such questions already represents an opening that did not exist before the CEO's

speeches of 1999 and 2000. In the case of Unilever, public controversy over GM technologies presented challenges to the company's existing framing of its consumers as purchasers, which was unable to cope with the full range of public concerns over GM. The NGO dialogue initiated by Unilever in the UK with the Green Alliance served to reframe the problem of commercialising GM technologies as one in which consumer and environmental NGOs had a very important role in articulating public interests in innovation. The Contact Group represents a hybrid forum in which a large number of actors become entangled in the processes of seeking to identify public attitudes to GM foods.

Social science research into public attitudes to GM foods was commissioned by the Contact Group, and this work became in effect a means of reframing relations between Unilever and its publics. Two significant conclusions of the report *Uncertain World* were identified by members of the Contact Group during interviews. First, public attitudes are not fixed but emerge from the multiple ways in which publics evaluate new technologies. Publics relate to the innovation of GM technologies both as 'consumers' and as 'citizens' and these different identities are often held in tension. Second, members of the Contact Group picked up on the report's conclusion that public ambivalence towards GM foods could be understood as reflecting the lack of spaces for public deliberation. Construction of such spaces could make the innovation of GM technology more accountable to 'citizen' concerns.

Within Unilever, the experience of the Contact Group and the commissioning of academic social science research contributed to the institutionalisation of the concept of 'consumer-citizen'. Yet tensions suggested by the term 'consumer-citizen' were present in Unilever's framing strategy, which depended on its relations with NGOs and academics developed through the Contact Group. As the term 'consumer-citizen' was institutionalised within the company, the hybrid context of its origin became apparent in different interpretations of the term. The Contact Group and the academic research it commissioned nonetheless remains an interesting experiment in corporate deliberation over a controversial new technology. Despite attempts within Unilever to interpret the concept of the 'consumer-citizen' in narrow, instrumental terms, its origins in a wider deliberative process have ensured that the term brings with it

awkward questions of the consumer's citizenship rights which Unilever will have to grapple with in the future.

The dialogue mode of framing casts the public as having legitimate concerns about the risks associated with GM technology. The expert-led dialogue groups are presented as deliberating these concerns, which are represented by the NGO and academic members of the groups. The efforts by DuPont and Monsanto to publicise their dialogue initiatives are designed to reassure an anxious public that these companies are listening to their concerns. Here, the companies' consumer-citizens are cast as observers of the companies' dialogue with the expert groups. In the case of Unilever's NGO dialogue, the concerned public is also cast as research subjects responding to verbal and pictorial stimuli provided by the moderator.

The corporation is cast as open to the concerns of its consumer-citizens in the dialogue frame. The corporation is also performed as a coherent and trustworthy actor. Particularly in the case of DuPont and Monsanto, great emphasis is placed on the responsiveness of the corporation to what it learns from listening to public concerns. This performance of responsiveness depends on the ability of the company to enter into a tacit social contract with a global public. As part of this contract, DuPont and Monsanto have employed mode of framing in conjunction with that of dialogue, that of transparency. In the following chapter, I explore how the two companies have been performed as 'transparent' to a global public. This corporate transparency, like corporate dialogue, institutionalises the companies' relations with consumer-citizens over biotechnology innovation.

Chapter 5

Performing Corporate Transparency: public information campaigns at DuPont and Monsanto

5.1 Introduction

The homepage of Monsanto's website is dominated by a picture of neat rows of soya growing in flat fertile farmland. In the foreground a doorway stands, as if by magic, in the middle of the field. A young girl in dungarees and blond plaits has her back towards the homepage visitor and is opening the door and peering through to the other side. The caption to this picture reads:

> Welcome to Monsanto. We are a global company committed to opening new doors that can help farmers around the world produce more and better food, care for their land and help protect the environment.
>
> (Monsanto, 2002c)

So, the girl who appears on Monsanto's homepage looking like an Alice in Wonderland, or perhaps a Dorothy figure, represents Monsanto, opening new doors for the world's farmers. However, she also stands on the threshold of the company's website, and she could be opening a door onto Monsanto's corporate world. The figure of the girl in dungarees therefore also represents a visitor to the website, inviting us to follow her into Monsanto's world.

Both DuPont and Monsanto have established websites specifically designed to communicate information about the companies and their research on agricultural biotechnology. These websites were designed and are maintained in the context of the global controversy over the regulation and commercialisation of GM crops. They are key sites at which these two companies perform themselves as socially responsible

corporations engaging with public concerns over biotechnology. Both DuPont and Monsanto use corporate websites to stage the narratives of corporate transformation discussed in Chapter 4. By contrast Unilever has not used its corporate website to perform itself in dialogue with the public over GM foods. This is because the company does not have a direct financial interest in the commercialisation of GM crops and there are risks of closely connecting the Unilever corporate brand with debates over GM foods. This chapter is concerned with the performance of DuPont and Monsanto as transparent, and the prominence of their corporate websites as locations at which these performances are staged.

DuPont set up its website "Straight Talk About Biotechnology" in 2000. This site contains information about DuPont's commitments to public dialogue, discussed in Chapter 4, and additional information about agricultural biotechnology. The website covers topics including an introduction to techniques in genetic engineering, a history of biotechnology and an overview of the regulation of agbiotech in the USA.

Monsanto's main corporate website contains information about the Monsanto pledges to public dialogue. Monsanto also has a website specifically designed to provide information about biotechnology called "Biotech Knowledge Center", which also exists in versions specifically designed for different regions. For example, in addition to the US version, there is a version for the UK, one for Germany, and one for Africa.[34] In conjunction with these websites Monsanto has published an online magazine, *The Biotech Advantage*, which provides a digest of three or four news stories covering the positive aspects of GM foods. This newsletter has appeared about twice a month since May 2001 and it directs its readers to Monsanto's "Biotech Knowledge Centre". In 2003 Monsanto launched a new website aimed at reaching a younger audience in North America, called "Biotechnology – Good to Grow".

The methodological approach I adopt in this chapter is a variation of what Christine Hine has called 'virtual ethnography' (Hine, 2000). As I discussed in Chapter 3, I have followed the corporations through the various sites at which they perform themselves in relation to public controversy over GM foods. I am therefore a

[34] This survey of Monsanto's web presence was carried out in January 2003.

participant in the construction of boundaries between public and private spaces of the corporation. DuPont and Monsanto both use their websites in their performance of 'corporate transparency'.

This chapter is an exploration of the corporate texts that I have recorded in my role as the audience for performances of the two companies. I augment texts taken from the various corporate websites with quotations taken from two interviews with people working at DuPont and Monsanto. Both these individuals were directly involved in regulatory affairs at the two companies, and both of them have often acted as spokespeople for their companies on GM foods. These interview texts add another layer to the empirical material, but are not categorically different. They too are presentations of the company, only here the tendency of corporate websites to present a monolithic edifice is less in evidence. As I have argued in Chapter 3, due to the controversial topics of my interview, and the experience of the people I was interviewing, these interviews must also be understood as moments in a sophisticated performance of 'the corporation'.

This chapter examines how DuPont and Monsanto have used the medium of the internet to represent themselves as corporations responsibly innovating agbiotech products. These self-representations are just one element of the wider performative strategies of these companies, but they are particularly interesting because they provide instances where the companies engage in 'region behaviour', constructing a front stage and backstage. In doing this, DuPont and Monsanto are constructing a version of public controversy over GM crops. Central to these corporate contributions to a technological public sphere is the concept of 'transparency'. This chapter explores how the DuPont and Monsanto websites develop notions of corporate transparency through their presentation as public doorways to these corporations.

In this chapter much of the empirical material comes from websites set up by Monsanto and DuPont, as well as reflections on these corporate initiatives gained through interviews. Section 5.2 explores the tacit models of the public understanding of science that are at work in performances of corporate transparency. Section 5.3 illustrates how DuPont and Monsanto have institutionalised transparency in terms of the public provision of scientific information. Section 5.4 deals with corporate

understandings of transparency as a mechanism for repairing public trust in corporate innovation. Transparency is also related to trust through the use that the DuPont and Monsanto websites make of visual cultural norms that equate 'seeing with believing'. Section 5.5 investigates the uses of interactivity to achieve corporate transparency. In particular, it explores the particular configurations of corporate websites as a medium through which transparency is attempted. The final section develops the argument that corporate transparency is an element of corporate accountability.

5.2 Corporate transparency and the public understanding of science

This section begins to explore some of the implications of the transparency mode of framing, and poses questions for the remainder of this chapter's study of corporate transparency in practice. Using insights from literature that has considered the origins of contemporary commitments to 'transparency' this section asks what it is that is being made visible and what it is that is made invisible through the performance of corporate transparency? Turning then to literature on the public understanding of science, this sections asks, how do these performances of the transparency mode of framing configure its audiences?

The DuPont and Monsanto websites have focused on communicating information about agricultural biotechnology and also on communicating the role of agbiotech corporations in biotechnology innovation. The corporate communications initiatives examined in this chapter rely on a particular vision of science as a guarantor of claims about the safety and benefits of GM technology. In tracing specific corporate initiatives to inform global publics, this chapter develops another element of the central argument of this thesis: in responding to public crises of legitimacy over the innovation of agricultural biotechnologies, corporations are engaging in the production of new identities in a changing political context. The new identities in question are the *socially responsible corporation*, answerable to an emerging *consumer-citizen* in a newly constituted, post-national public sphere. Chapter 4 explored the implications of the dialogical mode of framing on corporate constructions of hybrid spaces in which consumers' citizen-like concerns were drawn into corporate technological decision-making. This chapter develops the analysis of

the performative relations between the corporations and consumer-citizens by focusing on how DuPont and Monsanto are constructing themselves as accountable innovators of biotechnology through practices of corporate transparency.

Transparency is an important term in characterising modes of communication in contemporary societies. It is suggestive of particular kinds of relationship between the corporation and its publics in the context of controversy over commercialising products of biotechnology. The term transparency indicates a commitment to the verification of knowledge claims by direct observation of the claim's object. In this sense transparency can be understood as deriving its current power from the scientific culture of experimental empiricism. Studies of transparency have rejected the notion that it is an objective characteristic of an object. Rather, transparency and the associated practices of witnessing are achievements requiring the choreography of objects, instruments, people, texts and techniques to produce the transparent object and its observers (Shapin and Schaffer, 1985; Ezrahi, 1990; Haraway, 1997; Scott, 1998).

Scholars concerned with the politics of transparency have approached the term with different emphases. The role that transparency plays in legitimating political processes has been discussed by Ezrahi (1990), and the politics of the processes of achieving conditions of transparency has been argued by Haraway (1997). In both cases, these arguments are developed from Shapin and Schaffer's study of the emergence of experimental science in seventeenth century England (1985). The uses of transparency in liberal democratic discourse and practice were discussed in Chapter 2, as were its connections with experimental science. This section develops an understanding of transparency as a process for making some objects visible and others invisible. It also considers the ways that the practice of institutional transparency makes tacit assumptions about the public for which it becomes visible.

Transparency in its political sense implies the mutual visibility of citizens and state. The institutions of liberal democracy serve to make legible the needs, wants and wishes of its population. In turn, the achievement of transparency also renders the action of the state visible and therefore accountable to its population. Ezrahi argues that the vigour of liberal democracy in the West relies on the emergence of

experimental science in the seventeenth century, which employed an epistemology based on mutual witnessing of experiments – a 'union of eyes' – to establish objective facts. By process of analogy, liberal democracies developed a public political sphere in which the performance of political acts could be witnessed in order to establish their legitimacy. The capacity of witnesses to attest to the validity of an experiment or political act is, according to Ezrahi, the norm that gives rise to both credible knowledge claims and legitimate (liberal democratic) political orders. Ezrahi understands modern liberal democracy as arising from both an:

> [A]ttestive visual culture – the view of the world as a bundle of observable facts, which is discernable within the traditions and practices of Western science and technology – and the attestive visual cultural norms which underlie liberal-democratic concepts of action, authority, and accountability.
>
> (Ezrahi, 1990: 75)

Thus, 'transparency' in liberal democracies suggests the mutual legibility of state and citizens. The visual cultural norm of transparency is an expression of liberal democratic commitments to making legible the needs, wants and wishes of its population, and in turn, rendering the actions of the state visible, and therefore accountable, to its citizens. It is striking that companies like DuPont and Monsanto, when facing a crisis of legitimacy in corporate practices of innovation have invoked a term that has become central to understanding the functioning of a legitimate democratic state.

By contrast, Harraway (1997) has developed a different argument about the emergence of the particular form of visual culture described by Shapin and Schaffer (1985). At the time of the rise of experimental science, the architectural and literary technologies that facilitated the 'union of eyes' did so in a way that constructs a particular and gendered identity of the 'trustworthy witness'. However, the particularities of the witness identity becomes erased in the process of attesting to the validity of the experiment: the assemblage of witness, institutions, and literary techniques are made transparent in the process of universalising contingent truth claims. Rather than invisibility being a weakness, here transparency is a position of power.

In Harraway's discussion of the gendering of public spaces of witnessing she draws our attention to that which is made transparent, and that which is made 'invisible'. This contrasts with Ezrahi's concerned with the mutual visibility of state and citizens made possible by the transparency achieved by institutions. So 'transparency' is a tricky term, it is both about making visible and about making invisible. As the term is used in the context of describing the relations of science and society the double move of transparency requires careful analysis. This chapter explores what is made visible and therefore opened up to the public gaze through corporate performances of transparency. This chapter also pays attention to what is made invisible through corporate transparency.

In Ezrahi's terms political transparency is a condition which can be achieved only when witnesses have the capacity to judge the events taking place. Transparency as a mechanism of democratic legitimacy therefore assumes there is a public with the ability to engage critically with political events widely distributed throughout society. Similarly, when DuPont and Monsanto turn to transparency as a response to the contemporary crisis over GM foods they are making assumptions about the capacities of the transparent corporations' publics. The companies have attempted to achieve transparency by providing information about themselves and the biotechnology research they are doing. Their initiatives necessarily depend on the existence of public witnesses for their acts of corporate transparency. This raises the question of what capacity to judge or attest do these initiatives ascribe to their publics? Similar questions have been asked in the field concerned with the public understanding of science.

In a recent report on public attitudes to agricultural biotechnology in Europe, Marris *et al.* (2001) explore what assumptions governments and industry have about public attitudes to GM foods. The report argues that these stakeholders depend for their knowledge of public opinion on the results of questionnaire surveys, on spokespeople from NGOs and on representations of public views in the media. Marris *et al.* argue that these stakeholders have a consequently narrow vision of 'the public'. Furthermore, the report identifies a pervasive view shared by stakeholders that European publics are critical of GM foods due to their ignorance of the science underpinning the technology:

> According to this myth, there are facts on one side of the debate and ignorance and emotions on the other. Rational facts are founded solely on scientific evidence and demonstrate, to the best of our knowledge, that GMOs are safe. Thus, people who oppose GMOs are irrational; if only they understood the science better, they would be reassured and would accept GMOs.
>
> (Marris *et al.*, 2001: 78)

In practice, this characterisation of stakeholders' attitudes towards the public understanding of science co-exists with other views, as is demonstrated by this thesis. However, Marris *et al.* argue that there is a strong ideological commitment to the separation of scientific facts and public values in the institutions they studied. Such commitments to understanding the public as ignorant of the science on which objective risks of GM foods can be assessed is an example of what has been called the 'deficit model' of the public understanding of science (Wynne 1991, 1992). Critics of the deficit model, such as Wynne, point to the systematic dismissal of lay knowledges by institutional risk assessments. Michael (2002) has commented on the critical approach to the public understanding of science as adopted in Marris *et al.* (2001). He argues that both the traditional public understanding of science (PUS) approach characterised by the deficit model and its critics share assumptions about the humanism and incorporeality of public understanding. Michael argues for an appreciation of the heterogeneity of human agency and cognition. He also calls for greater attention to the bodily comportment of knowing; here Michael uses the term 'prehension' to indicate the embodied processes which characterise knowing subjects:

> If traditional and critical PUS presuppose the human subject of comprehension and apprehension, what prehension serves to highlight is the *process* of ongoing emergence of such human subjects. If traditional and critical PUS assume citizens who need to be, respectively, cognitively and institutionally empowered, a prehensive PUS would also attempt to chart how these citizens are continuously, heterogeneously produced.
>
> (Michael, 2002: 368, original emphasis)

The work on the public understanding of science by both Marris *et al.* and Michael have important implications for this chapter's study of corporate transparency. Marris *et al.* argue that in the cases they study there are deep institutional understandings of scientific knowledge and its role in controversy over GM foods. Michael argues that in studying public understandings of science it is important to appreciate that 'understanding' is a process embodied by subjects, whose identity emerges through

these processes of knowing. In studying corporate transparency, this chapter investigates the underlying assumptions about public knowledge and science in the transparency mode of framing. This chapter also explores the ways in which the particular practices of corporate transparency are producing forms of citizenship. In the cases of DuPont and Monsanto, interactivity is an important element in their communication of transparency.

The emphasis that DuPont and Monsanto place on the use of websites to achieve transparency is an expression of their commitment to interactivity. Kevin McSorley (2002) has shown that the company British Telecommunications (BT) has enacted its corporate social responsibility through engaging with its 'stakeholders' through interactive exchanges. BT's website becomes the means by which stakeholders are recruited and their relationship with the firm is constructed. McSorley argues that the scope of this relationship is ideologically shaped by the relationship of 'interactivity' to wider neo-liberal commitments to individual choice through acts of consumption. Museums have also been studied as a site at which interactive modes of relations are structuring the performance of institutional relations with its publics (Barry, 2001; Macdonald, 2002). This chapter explores the way that specific performances of corporate transparency have employed material practices of interactivity, practices that configure the consumer-citizen as an active participant in processes of corporate transparency.

The remainder of the chapter is organised around four closely interconnected discourses through which DuPont and Monsanto have performed corporate transparency. In the first, transparency is a means by which corporations can communicate the scientific arguments for the safety of biotechnology. The second is that public trust in corporations can be established if corporations are more open and transparent about their internal practices. The third interpretation of transparency is as a means of empowering consumers to make informed choices about the corporations' products. In this mode, interaction with the corporation is crucial in the process by which consumers learn about the products on offer. The fourth interpretation of corporate transparency is as a necessary condition for achieving accountability in order to establish the public legitimacy of corporate innovation.

5.3 Transparency and the public understanding of science

DuPont and Monsanto perform transparency as part of their wider corporate initiatives to engage in public debates about GM foods. For both companies, the term 'transparency' plays an important role in configuring their responses to public concerns about biotechnology. Greater transparency is both a desired outcome of the two companies' efforts to communicate with diverse publics, and a rhetorical resource which they use in their attempts to engage with publics across the globe. Transparency is thus both a desired goal in itself, and a means for corporations to engage with publics over biotechnology. These two dimensions of transparency are closely interconnected, and both depend on a political culture in which visual representation is allied with processes of fact-making.

Both DuPont and Monsanto have made public commitments to providing more information about their development of agbiotech products in the CEOs speeches discussed in Chapter 4. When Monsanto's CEO, Verfaillie, made his "A New Pledge for a New Company" speech in November 2000, he began by referring to the link between public trust and transparency. According to Verfaillie, in conditions of public mistrust, greater corporate transparency is required in order to establish public confidence in agbiotech products. Likewise, in an equivalent speech DuPont's CEO committed the company to providing more information to the company's consumers (see Figure 5.1).

Second, we will advocate informed consumer choice through meaningful information and product assurances. Consumers are always the ones who make the choices. However, more and better science-based information must be made available to help with these choices.

(Holliday, 1999: 6)

Transparency
We commit to transparency by making published scientific data and data summaries on product safety and benefits publicly available and accessible, and we commit to working within the rigorous, science-based regulations as required by appropriate government agencies around the world.

- We will make both Monsanto research and external research by universities and other institutions available through the Internet and other public venues.
- We commit our support for a mandatory pre-market notification process for Food and Drug Administration (FDA) review of all biotechnology products in the United States.
- We commit to work toward the establishment of global standards for the quality of seed, grain and food products.

(Verfaillie, 2000a)

Figure 5.1 DuPont and Monsanto commitments to transparency

The speeches given by the CEOs of DuPont and Monsanto in September 1999 and November 2000 were elements of the companies' performance of transparency. The CEOs both talked publicly about the processes the companies went through to arrive at their policy of engagement with public debates about biotechnology through dialogue with stakeholders, and through greater corporate transparency. As with the corporate modes of framing dialogue discussed in Chapter 4, the speeches committed the companies to institutionalise corporate transparency (see Figure 5.1). Both companies emphasised the importance of more effectively communicating the scientific basis for the development and regulation of GM crops. Whereas the dialogical mode of framing was institutionalised in such a way as to bring public perspectives into the companies as part of their decision-making, the transparency mode of framing produced representations of the corporation for external audiences.

Both DuPont and Monsanto have institutionalised their commitment to openness through publishing scientific arguments for the safety and benefits of GM crops and

food. When Monsanto published its first report, *Fulfilling Our Pledge*, on its progress in meeting its transparency pledges announced by its CEO in his November 2000 speech, the two main achievements of the transparency pledge are listed:

- Biotech Crop Safety Data Made Available on Internet
- Bibliography of Monsanto Papers Posted to Internet

(Monsanto, 2002a: i)

According to this check-list account of Monsanto's transparency, it is the dissemination of representations of scientific information on which the achievement of transparency depends. What is made transparent in the first case is the scientific basis for the regulatory approval system, and in the second it is the broader scientific effort underway at Monsanto.

By the time Monsanto published its second pledge report in 2003, *Commitments to Our Stakeholders* (Monsanto, 2003), it had posted nine safety assessments on five different crops (cotton, soy, maize, canola and potatoes). These safety assessments were available for downloading from the "Our Commitments" section of Monsanto's corporate website. The language of these assessments is technical, and it includes data that would be supplied to the FDA under the pre-marketing notification requirements. "The posted information is a summary of the information reviewed by regulatory authorities throughout the world." (Monsanto, 2002a: 6). For example, the assessment for Roundup Ready® Soy is 36 pages long and contains 110 references to a range of sources, most of which are articles in peer-reviewed journals. The assessment discusses the molecular characterisation of the GM soya and tests on its safety, including tests that would indicate potential allergenic properties of the proteins produced by the introduced genes. These representations illustrate the scientific rigour of the regulatory regime.

DuPont also put its commitment to transparency into practice through posting information onto its website, "Straight Talk About Biotechnology", which it had developed as the centrepiece of its response to public controversy over agbiotech. By November 2002 the "Science Knowledge" section of this site contained three extended articles, which were written for a lay audience, but which were heavily

referenced. The titles of the three topics comprising this section were: "Food Allergy"; "Impact on Feed and Livestock"; and "Methods Used in Biotechnology". The final part of the "Science Knowledge" section was a list of journal articles published by DuPont employees. This list comprised 71 pages of references organised alphabetically by title in a way that would make it hard to use the list to interrogate the company's scientific arguments about agricultural biotechnology. The list appears to present visual evidence for the claim that DuPont scientists have done lots of research:

> DuPont scientists have been improving plants though biotechnology for many years. These scientists regularly share their expertise through articles such as those listed below.
>
> (DuPont, 2002e)

The Monsanto website provides similar lists, although these were organised by year. So, for example, a visitor to the Monsanto.com website can learn how many articles were published by Monsanto scientists during 2001.

The specific steps which DuPont and Monsanto have taken to communicate the scientific arguments for the benefits and safety of agbiotech are based on the assumption that the evidence is already in existence, and the problem has been one of communicating this to a sceptical lay public. This position is apparent in the condensed version of Monsanto's transparency pledge, which appears in the company's report *Fulfilling Our Pledge*: "Transparency: We will ensure that information is available, accessible, and understandable."

For both Monsanto and DuPont, company websites were the principal means by which these commitments to make information available was carried out. By focusing on the internet as the means of representing the corporations and its products, these information campaigns construct a particular 'global' public for the companies, and also shape the information that is communicated. The corporate website becomes for DuPont and Monsanto the principle medium through which they perform corporate transparency. Representations of the companies and their scientific research now circulate in the rapidly expanding medium of the internet. The communications

initiatives of DuPont and Monsanto are ambiguous about the capacity of internet users to critically engage with the information provided by the companies.[35]

In an interview with me, a regulatory affairs manager for DuPont, Tom Gaskin, spoke of the use that DuPont was making of the internet in its campaign to convince people of the scientific basis for claims that GM crops were safe and desirable. According to Gaskin, the internet is a tool that allows DuPont to communicate quickly with a large number of people. These are important attributes which shape the way that corporate transparency is being performed. The speed of the internet suggests the possibility for interactive relations, as the company can quickly respond to changing public demands. However, Gaskin acknowledged that the internet can only present information, and what people make of it, or if they read it, is another matter:

> The internet in particular is the great equaliser in its ability to provide a lot of information. I think it is a great tool, it's speedier, it's faster, it's nicer than brochures. But I think it is still a vehicle to provide information for the public. You can provide the information but it's up to the public to decide "well, I want to read it, I want to take the time to understand, I want to take the time to do that." That perhaps is the difficult part.
>
> (Gaskin, interview, 24 April 2002)

The corporate websites of DuPont and Monsanto achieve transparency through providing information to consumers and citizens. In the two companies' responses to public controversy over GM foods, the information provided focuses on scientific arguments that GM technology is safe. The companies' initiatives refer to the public as decision-makers who are empowered by information about the technology, however, the implicit reliance on a deficit model of the public understanding of science means that the decisions are rather narrow, and amount to 'should we trust the companies and regulators to develop and apply this science in the public interest?' Monsanto's description of the provision of information through the website suggests that the problem of making information accessible is answered by the internet:

> While much of the safety information has been published in scientific journals, this is the first time the information has been assembled in documents that provide

[35] The internet is simultaneously a space for outlandish conspiracy tales, for shopping, for political identification, and for self-empowerment through education (Hine, 2000; Rose and Novas, 2003).

> a summary of the food, feed, and environmental safety of each product in a single detailed document and made readily available through an easily accessible venue like the Internet.
>
> (Monsanto, 2002a: 6)

Underlying the corporate initiatives to engage with publics there is a persistent commitment to differentiating between the scientific facts of the matter, and the values and emotions that make up public attitudes to biotechnology. Working within this deficit model of the public understanding of science, transparency is used at DuPont and Monsanto to refer the process of disseminating public information about biotechnology:

> Welcome to the Knowledge Center, sponsored by Monsanto. We hope you will find this evolving collection of news items, technical reports and other documents useful, and that the material assembled here – which represents many points of view – will promote a deeper understanding of agricultural biotechnology.
>
> (Monsanto, 2002d)

In Monsanto's *Fulfilling Our Pledge* (Monsanto, 2002a) quotations from several key Monsanto executives describe what transparency means to Monsanto. Roy Fuchs is the director of regulatory science at Monsanto, and leader of the company's "Transparency working team". In his quotation he highlights the assumption that corporate transparency is necessary for informed public discussion about biotechnology:

> "We believe making this information more accessible has significant value for the scientific community and the public because access to comprehensive and scientifically sound information is essential for advancing an informed discussion about this technology," he said.
>
> (Monsanto, 2002a: 6)

Tom Gaskin, the thoughtful federal scientist turned government relations manager at DuPont, expressed his own commitment to the 'deficit' understanding of public ambivalence. Gaskin argued that as the public in general are not familiar with science, they tend to be averse to technological risks. According to his analysis, the public's tendency toward caution can be exploited by groups who have an interest in undermining biotechnology. Gaskin went on to note that this is not just a problem for the USA but is a global problem; one of the causes of which is a failure of national

education policies to support science education. This, according to Gaskin, presents corporations like DuPont with the responsibility to remedy this situation through supporting public understanding of science initiatives. He suggested that the company should not only put pressure on governments to improve science teaching, but also intervene directly in science education. DuPont supports schools with resources for science education, and by communicating science directly to the public through corporate information campaigns:

> I think that generally we still have a general public that doesn't understand much of the science, and that is to be expected. Scientific issues can become very complex, and the general population – and this is not just indicative of the United States, it is a global problem – the general population doesn't have a strong foundation in science...
>
> We found that with some explanation the general public – well individuals we have talked to – understand more. But it takes that education, that period of investing in education before they become more comfortable with the science.
>
> (Gaskin, interview, 24 April 2002)

DuPont's "Straight Talk" website is designed primarily for a North American audience. The information it contains about biotechnology regulation refers to the US system and at the end of 2002 a Spanish version of the site was launched, which focused on Mexico. There are also Monsanto websites that are targeted at particular countries. The following quotation from the UK website of Monsanto performs Monsanto as a company with a social responsibility to inform the British public about GM food:

> In order to help improve public understanding of modern biotechnology and genetic modification, the food industry in this country is working to keep consumers better informed. Public information is a priority and we at Monsanto are working to achieve this through a variety of different approaches.
> www.foodfuture.org.uk
> www.abcinformation.org
>
> (Monsanto, 2002e)

A tension runs throughout the website initiatives to provide information about the science of biotechnology. On the one hand improving the public understanding of science is presented as a means to increase public acceptance of biotechnology, and on the other hand, information is intended to empower the public as decision-makers.

This tension is expressed by Gaskin who talked about DuPont's "Straight Talk" initiative in terms of its ability to assist in the process of decision-making. His use of the term "independently" suggests the conditional nature of this decision-making. The website is a commitment to the provision of scientific information, so it would suggest that basing a decision on scientific evidence helps to ensure its independence:[36]

> I think that these are all efforts to increase public awareness, public understanding, and to provide information for the public themselves, independently to reach their conclusion. I see those all as efforts, Rob, to provide that information. The internet, of course, and brochures.
>
> (Gaskin, interview, 24 April 2002)

Both DuPont and Monsanto have institutionalised their commitments to corporate transparency by providing information about the science of biotechnology on their websites. These initiatives operate with a deficit model of the public understanding of science. Gaskin, who has been involved in setting up DuPont's "Straight Talk" website, confirms that he has worked with the assumption that if people learn more about the science of biotechnology they will become less concerned. However, the form in which scientific information is provided by DuPont and Monsanto is not designed for critical engagement. Rather than assuming attestive public witnesses these initiatives are designed to impress their audience by the volume of research which has gone on in support of the companies' biotechnology products.

The transparency mode of framing corporate engagement with public controversy over GM foods contrasts with the dialogical mode in the way that it uses the performance of representation. In the case of the dialogical mode, public concerns are represented in hybrid spaces by embodied performance of expertise and diversity. In the case of Unilever, these embodied forms are augmented by representations of public attitudes by social science. In these cases representation of consumer-citizens occurs in localised hybrid spaces. The transparency mode of framing represents science and the corporation using corporate websites. These also are hybrid spaces because they are owned and managed by 'the corporation', and they become one of

[36] That the authority of scientific advice is used to establish political credibility of government decision-making is well understood (Jasanoff, 1990).

the principle means for the authorised representation of corporate policies and actions. However, these spaces are part of an unruly and ambiguous public sphere of the internet. Thus, representations of the transparent corporation are cast out, with the hope that they will be visited by the companies' concerned consumer-citizens.

5.4 Transparency and public trust

Corporate transparency is more than a tool for corporate science communicators. The continuing hold of the deficit model of public understanding of science is complicated by the multiple uses to which 'transparency' is put by DuPont and Monsanto. Greater transparency is used by the companies in their attempts to rebuild public trust in corporate innovation of agbiotech products. However, in the examples of DuPont and Monsanto, transparency operates as a halting and unreliable mode of corporate relations with its sceptical publics.

It is not easy to identify unequivocally whether or not DuPont and Monsanto ever achieve a condition of transparency. Transparency does not arise from unconditional openness by the corporation. The company is not a static object whose boundaries and contents can be opened up to an objective view. Just as the objects of scientific investigation only become known to a scientific community, and achieve the status of objectivity through the careful crafting of technological means to 'see' the object, so making a corporation transparent requires the mediation of technologies that make the corporation visible. The process of making the corporation visible frames both the corporation itself and its audience.

Chapter 4 discussed the ways that press releases, brochures and websites carefully staged performances of 'behind the scenes' working of the companies' advisory groups. This form of region behaviour, which constructs public representations of the otherwise internal operations of the companies, can be understood as a moment when the dialogical frame overlaps with the transparency frame. All the barriers that normally mark the private 'backstage' of a company, such as perimeter walls, reception areas, and confidentiality agreements, are made invisible. This active

process of simultaneously revealing and concealing information about themselves is central to corporate performances of the transparency mode of framing.

Monsanto is explicit about the tensions inherent in the term 'corporate transparency': "we understand the concept of transparency requires achieving a balance between being open and accessible and preserving information essential to the operation a competitive enterprise" (Monsanto, 2002a: 6). Nevertheless, the company explains its commitment to transparency as arising in part from the need to convince people that GM products have been adequately tested to ensure that they are safe. Monsanto's CEO, commenting a year after he first made the transparency pledge on behalf of the company, points to the contribution that Monsanto's enacting of transparency can make to public confidence in the safety of GM products:

> The safety evaluation of biotech products is unparalleled for our food crops. But no amount of research and testing is convincing unless people know about it. Posting this information publicly helps contribute to transparency and dialogue.
> (Verfaillie, 2001)

The transparency achieved by supplying information about the safety of GM crops plays a part, according to Monsanto's CEO, in convincing people that the regulatory system and the company's diligence can be trusted. As the above quotation from Verfaillie makes clear, transparency only works if people "know about it". In order for transparency to work, Monsanto has to draw attention to its policies, using the Monsanto website, the speeches of its CEO, and the pledge reports *Fulfilling Our Pledge* (Monsanto, 2002a) and *Commitments to Our Stakeholders* (Monsanto, 2003), in which Monsanto comments on how it is performing in meeting its pledge targets.

In the first of the pledge reports each pledge has a section. The transparency pledge section takes up two pages, the first of which includes the pledge and details of how Monsanto has taken steps to meet it through posting information on the company's website, and also comments from both Monsanto's CEO and the "leader of the company's Transparency working team." Half of the second page is made up of a case study, which looks at how agbiotech companies have commissioned and reported research on the effects of cultivating GM *Bt* maize on monarch butterflies. The other half of the second page contains a box with the title "An Outside Perspective" and a

portrait photograph of an associate professor of Food and Nutrition from Purdue University, Indiana.

The professor, Charles Santerre, begins his commentary by acknowledging the openness of the term 'transparency'. He suggests that one use of transparency can be to address public suspicion aroused when concerns of "consumers, researchers, and public interest groups" are not addressed when the GM product is commercialised. His assumption is that in cases where corporations appear to be secretive or evasive, public suspicion is aroused. To counter this public suspicion Santerre believes that it is important for companies to be able to show that the regulatory process is scientifically rigorous, both to demonstrate to a lay public that the products are regulated, and to open up the process to greater "scientific scrutiny":

> "As biotechnology products have been introduced into food chains throughout the U.S. and the world, getting to a working definition of what transparency actually means has been difficult. All too often, things that are important to consumers, researchers, and public interest groups are bypassed. When that happens, rightly or wrongly, people become suspicious and public confidence is eroded... Some of the most common questions that I encounter during a presentation relate to whether these products have proper regulatory oversight and whether the scientific information used in the oversight process is available for scientific scrutiny."
>
> (Monsanto, 2002a: 7)

In the same quotation, Santerre goes on to spell out the relationship between transparency and social acceptance of technology. Santerre describes two purposes that transparency serves, the first being to promote public accountability of corporations and regulatory agencies, and the second to ensure the social acceptance of new technologies. Transparency as an end in itself can, according to Santerre, "build consumer confidence":

> "Transparency serves several purposes. In addition to the obvious one of keeping companies and government agencies accountable to the consumer, transparency helps build consumer confidence and eases the acceptance and adoption of new technologies. When the safety data for new products are available, society at large can make an informed decision on acceptability."
>
> (Monsanto, 2002a: 7)

It is this instrumental use of transparency to achieve consumer confidence in new technologies that has been the subject of critical academic inquiry. In *Wising Up* (2000) Grove-White *et al.* argue that public calls for more information about biotechnology should be understood as expressing more wide-reaching ambivalence about the governance of innovation. The difference between these two position lies in alternative understandings of how the transparency mode of framing performs the consumer-citizen. The first approach assumes that the provision of information about corporate biotechnology will perform corporate transparency, and that this will increase public trust in new technologies. This formulation casts the public in a passive role as spectator of corporate performances. The second approach assumes that attestive witnesses must be actively configured and engaged through the transparency mode of framing. Chapter 2 discussed the difficulties that corporations will face in producing what is 'really going on backstage' in conditions characterised by a lack of public trust. The following section explores how the visual culture of transparency is used to produce images of the companies' backstage.

Transparency, or seeing is believing

Both DuPont and Monsanto's public communications initiatives combine the use of websites with a commitment to visual metaphors associated with scientific investigation. One such intervention is a website launched by Monsanto in 2002, "Biotechnology Good to Grow", which aims to introduce the advantages of agbiotech to a younger US audience. The introduction on the homepage of this website indicates the central place that visual images have in the website. The audience is scripted as a curious and open-minded child, intrigued by the wonder of biotechnology. The audience is invited repeatedly throughout the site to "look closer":

> Welcome to the Biotechnology Good to Grow Web site. Take a closer look at this site and discover how plant biotechnology allows for fewer pesticides sprayings on the crops we grow today. Fewer pesticide sprayings benefits the environment by reducing consumption of natural resources, which enhances the sustainability of agricultural production. It is amazing what you will find when you look closer.
> (Monsanto, 2002f)

Allied with notions of corporate transparency are commitments to a visual culture in which 'seeing is believing'. The websites of both DuPont and Monsanto become media through which images of the corporation are presented to an interested public. Being able to 'see' the corporation, its scientific rigour, and the people working for the corporation, are strategies to establish public confidence. Throughout the two companies' websites individual employees are introduced. One example is Dr. Carl Simmons, who appears on DuPont's "Straight Talk About Biotechnology" website. A visitor to this site can click on "Dr. Carl Simmons" and the browser will take them to a page on which Dr. Carl Simmons' photograph is shown along with a statement:

> My experience with hybrid seed corn began with detasselling, roguing, and tillering in production fields as a youth in Olivia, Minnesota. I first studied genetics at the University of Minnesota, later earning a Ph.D. in plant molecular genetics at the University of California, followed by post-doctoral research at Yale. I joined the Pinoeer Research & Product Development Disease Resistance team in 1995.
>
> (DuPont, 2002i)

This shows the strategy of putting a human face to the scientists – to encourage public trust in DuPont's stewardship. Note the two repertoires that are used: farming in the Midwest, science on the two coasts. The personal commitment that Dr. Carl Simmons communicates provides a name and a face to DuPont's claims that it is developing agricultural biotechnology for altruistic reasons:

> My dream is to see the technology I helped develop growing in fields and making a positive difference for the world. I am confident that the various technologies we are developing and using will help meet a major challenge of the 21st century – extending food yields from farmland that decreases in size each year and is continually degraded by erosion, salts, and drought.
>
> (DuPont, 2002i)

Even in the more technically complex text about the gene transfer techniques 'taking a closer look' is an important motif. A picture shows a smiling woman looking up from her lab bench:

> In this laboratory, you see scientists at work preparing plant tissue for the introduction of new genes into this plant.
>
> (Monsanto, 2001b)

Again, the familiarity and the everydayness of biotechnology research is emphasised:

> Starting at the top with the 'McDonald's' sundae cup holding a 'mother' plant which will be used to cut pieces of tissue to start the process.
>
> (Monsanto, 2001b)

The most striking example of the notion of 'seeing' what is going on at the corporation through accessing its website is provided by Monsanto's "Biotech Knowledge Center" website. The site relays images from web cameras set up in Monsanto's laboratories. The images are not live, but the viewer is asked to 'take a closer look':

> There's a lot going on at Monsanto's Chesterfield Village Research Center, one of the world's largest devoted to plant biotechnology. In 250 laboratories, over 100 plant growth chambers and 2 acres of greenhouse space, top researchers from around the world are working to help achieve sustainable agriculture and to help make possible the vision of abundant food in a healthy environment.
>
> Use the arrows on the toggle icon and click on the area you would like to explore. Zoom in with the "+" and out with the "-."
>
> Have fun. It's amazing what you can discover, when you take a closer look.
>
> (Monsanto, 2002g)

A commitment to openness about research is a frequently recurring element in the public information campaigns of DuPont and Monsanto. Transparency as a motif is both the achievement of corporate openness, and the means by which that openness is achieved. Public information about corporate research is one of the ways that corporate transparency is demonstrated. Efforts to educate the public about biotechnology research and development relies heavily on visual images and metaphors – pictures and diagrams of the research and the laboratories, and notions of seeing 'inside' the lab. However, the double use of transparency in corporate information campaigns does not challenge the linear model of innovation implicit in narratives of technological progress, but rather reinforces them. It does this by locating the moment of transformation in the laboratory, at the same time as excluding the viewer from the space of the laboratory.

Brown and Michael (2002) argue that provision of information only achieves transparency under conditions characterised by public trust in the reliability of the provider. If the problem is lack of public confidence, then providing information will not be interpreted by a sceptical public as transparency. This observation points back to the distinction between the two understandings of the transparency mode of framing. The first assumes that institutions perform transparency by disseminating information about what takes place within the institution. The second understanding adds the active participation of an attestive audience of witnesses, which combines with the institution to produce transparency.

The concept of transparency plays an important wider role in democratic governance. When thinking about transparency as supporting democratic processes, the outcome of institutional transparency is not public trust as an unconditional acceptance of institutional self-presentation. Rather, the active participation of an attestive public together with institutional performances of transparency result in conditional public legitimacy. The website performances of DuPont and Monsanto contain elements of both the 'trust' and the 'legitimacy' understandings of transparency. These differences play out as tensions in the ways that the transparency mode frames the consumer-citizen.

5.5 Transparency through interactivity

Visual metaphors of 'seeing' the corporation are closely associated with concepts of transparency. The ways that both DuPont and Monsanto have enacted corporate transparency have also relied on 'interactivity' as a metaphor for organising the corporations' relations with their publics. Interactivity is expressed through the use of the internet in many of the companies' information campaigns. Interactivity also associates corporate transparency with the empowerment of individual members of the public to engage in decision-making as consumers of the products biotechnology innovation.

As this chapter has argued, transparency is not a straightforward quality. However, the work that goes into achieving transparency is well understood by those whose job has

required them to contribute to corporate transparency during recent years. In an interview with me one of Monsanto's leading spokespersons in the UK commented that transparency requires more than publishing ever increasing volumes of information. The quotation below illustrates his view that not only do people need to be attracted to visit the website, but they must also have a sense that the information that they can find is relevant to their interests. Here, interactivity provides a connection between the visitor to the website, the company 'behind' the site, and the information that is provided. In this context the spokesperson talked about the emphasis that Monsanto in the UK placed on responding to people's questions:

> Transparency is not only about publishing more, but it's about making sure people are aware that this stuff is around. It's also about having a website that's very attractive to people to go in and find out information and making sure that we've got hotlines so that if people have got a question – I mean every day we have a number of questions on any subject you like, and we always try to get back with answers.
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

This understanding of the importance of providing information that addresses public concerns is embodied in the design of the websites of both DuPont and Monsanto. The companies have sought to make their internet based communication campaigns 'interactive'. One of the ways they have done this is by designing websites that repeatedly ask for feedback from visitors to their sites (see Figure 5.2).

DuPont "Straight Talk" website:
Biotechnology is the Science of Miracles.
Recognizing that questions are raised about the science surrounding biotechnology, teams of scientists at DuPont have reviewed and summarized scientific information from diverse sources. We encourage you to read about these areas and share your perspective at Contact Us.

(DuPont, 2002g)

Monsanto "Good to Grow" website:
Facts And Fiction
As new technologies are introduced, there are always a wide variety of questions. We are committed to listening and providing fact-based answers to some of the common questions about plant biotechnology. You will definitely learn a few things about Biotechnology that are GOOD TO KNOW!

(Monsanto, 2002h)

Monsanto "Knowledge Center" website:
We want to hear your views and answer your questions. Please explore, participate, and tell us what you think.

(Monsanto, 2002i)

Figure 5.2 Questions and answers on the internet

For the information campaigns run by the two companies, interactivity extends beyond soliciting and responding to questions from visitors to the site. The organisation of the websites takes advantage of the ways in which the internet is interactive, in particular, the way visitors can choose the routes they take through the site.

> Quick Course: Join us on an interactive journey through the history, science, safety and promise of biotechnology. Our Quick Course provides the information you need to understand how plant biotechnology relates to public health, genetic engineering, and genetically modified food.
>
> (DuPont, 2002f)

Interactivity as the mode of organising material on the website is most dominant on Monsanto's "Good to Grow" website, which is designed for children. Here interactivity is used to hold the attention of the visitor and direct them through a range of quizzes designed to communicate a few very basic pro-biotechnology messages. In the example below (see Figure 5.3), the questions are quoted together with the answers which are revealed by clicking the multiple choice options.

Here is an opportunity to test your understanding of plant biotechnology. Click on the nine squares to reveal questions and multiple choice answers. Why not invite your family and friends to explore this with you?

What are some of the benefits of biotechnology?
A. less pesticide use
B. grow more food

C. grow more nutritious foods
D. all of the above
That is absolutely correct! D. All of the above

Biotech crops undergo more testing than conventional crops.
A. True
B. False
Correct! Your answer is good to grow! A. True

Figure 5.3 Monsanto online biotech quiz (Monsanto, 2002j)

Another way that 'interactivity' is used to present information on the websites is the use of the 'FAQ' trope. Here, some of the companies key messages about the safety and benefits of GM technology are presented as answers to 'Frequently Asked Questions'. For example, the DuPont "Straight Talk" website has an extensive section that uses 'FAQs' to present detailed arguments that cite peer-reviewed journals. The quotation below illustrates the close relationship between transparency and interactivity in the case of the Monsanto pledges and DuPont commitments. In the presentation of scientific arguments for the safety and desirability of GM crops there is frequent use of the device of the 'FAQs' to raise some of the complex and serious concerns raised by critics of GM foods. One such example is the possibility that because the site at which the transgene is inserted into a plant genome is inevitably random, unforeseen by-products may be created by interrupting metabolic processes unrelated to the trait being introduced.[37] The 'FAQ' trope allows these tricky questions to be raised and addressed by the company itself:

[37] In this regard GM plants are different from GM bacteria, for which control of the site of transgene insertion is possible.

> Though the scientific methods used to develop products with biotech tools have been developed over the past 70 years, some perceive the techniques as new and are asking questions. Some of these questions are:
> - Are transgenes inherently unstable in either expression or inheritance?
> - Are transgenes safe and wholesome for consumption?
> - Does random insertion of the transgene cause unexpected changes in the transgenic crop, especially in its nutritional quality or safety?
> - Do plant viral promoters used in many transgene constructions have a high propensity to recombine with the host plant genome or with organisms that might be exposed to the DNA of transgenics?
>
> (DuPont, 2002h)

Even Monsanto's "Good to Grow" website contains some more detailed discussion of the arguments in favour of GM crops. These appear in a section of the website titled "Frequently Asked Questions":

> **6: Does biotech cotton help the environment?**
> Insect-protected cotton has helped reduce our reliance on insecticides, and herbicide-tolerant cotton requires less herbicide. According to one study, more than 8 million fewer pounds of insecticides were sprayed on insect-protected cotton crops in 2001.[12] Herbicide-tolerant cotton can withstand over-the-top applications of herbicide, allowing growers to adopt practices that are better for the environment and that conserve soil. Biotech cotton has enabled growers to reduce pesticide sprayings, which conserved almost 94 million gallons of water and nearly 2.5 million gallons of fuel in 2000.[13]
>
> [12] Phipps R. and Park J.R. "Environmental Benefits of Genetically Modified Crops: Global and European Perspectives on their Ability to Reduce Pesticide Use." Journal of Animal and Feed Sciences, 2002.
>
> [13] Dr. Roger Leonard, Louisiana State University, and Dr. Ronald Smith, Auburn University. "IPM and Environmental Impacts of Bt Cotton: A New Era of Crop Protection and Consumer Benefits," 2001.
>
> (Monsanto, 2002k)

Interactivity is therefore used by the information campaigns of DuPont and Monsanto to attract visitors to their websites by ensuring that they address public concerns and interests. Interactivity is also used as a trope for presenting information. In both senses interactivity relies on its connection with the empowerment of visitors to the website to choose their own route through the website. However, as Macdonald (2002) has shown in the case of the use of interactivity in museums, it also constrains the kinds of relationships between the visitor and the information on display. In the cases discussed here, the companies retain complete control over what information is displayed on their websites. The limited sense in which 'the public' has a voice in the

objects made visible by corporate transparency is relevant when considering the extent to which such transparency can hope to achieve corporate accountability to wider publics.

5.6 Transparency and public accountability

If the uses to which transparency is put by DuPont and Monsanto are varied, then so are the objects of transparency. When the companies enact 'transparency' through public information campaigns, then the object becomes information about the scientific basis for developing and regulating agbiotech. When transparency is used as a means to increase public trust in the corporation, then 'transparency' itself becomes the object of corporate communications campaigns. In cases where transparency is an element of corporate performance of 'public accountability', the object made visible is the corporation.

In his introduction to Monsanto's report, *Fulfilling Our Pledge*, the company's CEO describes the contribution that the pledges make to transforming the company. It is notable that he draws a distinction between the old "science-focused" Monsanto and the new Monsanto, committed also to its "social responsibilities". Transparency, then, like dialogue, is a mode of framing the companies' relations with a newly vocal public in the contest of the GM controversy. The transparency mode of framing was introduced by managers of companies like Monsanto to cope with the changing political conditions in which they operate. Rather than the science-focus ensuring that what the company produces will be beneficial to society, the company also has to engage with "stakeholders". Transparency operates together with dialogue to enrol stakeholders in a process of legitimating corporate decision-making. The use of the term transparency therefore goes beyond the narrow achievement of transparency represented by the publication of scientific safety reports and corporate bibliographies. In the extract below from the introduction by Monsanto's CEO to the company's report, *Fulfilling Our Pledge*, the CEO recognises that the company is operating in a context in which stakeholders have some power in defining what constitutes the company's social responsibilities:

> The Pledge implementation in Monsanto has been a project I believe is absolutely imperative and one that I have led personally. I hope that over time it will help transform our company from a science-focused company, to a company that has its basis in science but is also committed to its social responsibilities – a company that is open, transparent, and beneficial to all its stakeholders.
>
> (Monsanto, 2002a: 1)

As it is introduced in Monsanto's website, the scope of the transparency pledge seems at first to be wide-ranging. Transparency is discussed as a "process" by which Monsanto communicates not only its "activities, policies, data" but also the internal processes Monsanto goes through in making major decisions. This discussion of corporate transparency also acknowledges that information given out by Monsanto will not be taken at face value, but will be weighed up by a critical public audience who will judge its reliability:

> It is our intention to pursue a process that ensures that Monsanto's activities, policies, data where possible, as well as the processes we undertake in making major business decisions are shared in an open manner that is judged to be clear and accessible to the people we do business with and other interested parties.
>
> (Monsanto, 2002a: 6)

A leading spokesperson for Monsanto in the UK, spoke in an interview with me about his understandings of the objectives of the corporate commitment to transparency. It was self-evident to him that companies would have commercial secrets. The transparency pledge, according to the spokesperson, provided a framework that he could use when responding to what he saw as the negative impression widespread in the UK that companies like Monsanto are secretive, and therefore to be suspected of not acting in the public interest. The pledge was about communicating the research done by the company that is used by regulators to approve the crops and food as safe.

> Regulatory bodies have tended to work on a level of confidentiality with business information. Now what we have tried to do in the pledge is say that in order to help a broader range of stakeholders understand and be able to debate with us about the statements we make about safety, or the approvals systems makes about it, then we are going to make an effort to get more of that information available.
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

The Monsanto, UK spokesperson also explained the transparency pledge in defensive terms. It encourages the company's scientists to publish more of their work in peer-

reviewed journals in order to dispel the suspicion that the company is secretive and therefore not to be trusted:

> We are doing a lot more to make sure people can't say – can't use the old throw away line – "Ah well, all their work is done in their own labs therefore it must be suspicious, and it's not been peer-reviewed, therefore we can't trust it".
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

'Transparency' can then also be used as tactic in an adversarial debate. In the same interview, the Monsanto manager recalled a collection the company had made of all the peer-reviewed articles published on GM feeds for animals. The company then presented this file to one of its staunchest critics in the UK, the Soil Association:

> This file, for example, was sent to the Soil Association because they had stood up at a conference and said that none of this work is peer reviewed. So we said: "here you are, read this" – and there's nearly three inches, or two inches of paper there. There are dozens of peer-review papers on this subject, it is a very well researched area. "Please accept this with our compliments, and if you have further questions come back and we'll try and work with you on it."
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

The relationship between dialogue and accountability are directly addressed in the first of Monsanto's pledge reports. In the quotation below, the company lists the groups to whom it considers itself accountable, including "society" at large. It then goes on to link accountability with the dialogue mode of framing discussed in Chapter 4:

> We are accountable to a broad range of groups that give us license to operate: our shareholders, our customers, our communities, consumers, society, and each other. Accountability begins with taking ownership of our company's operations and success by being accountable for achieving results and making wise decisions. Accountability requires dialogue. Listening, consultation with customers and other important stakeholders, and involving outside views in internal decisions will help us to achieve the results that our shareholders expect.
>
> (Monsanto, 2002a: 4)

Returning to my interview with one of Monsanto's UK spokespeople, this relationship between transparency and dialogue is problematised. He pointed to the apparent contradiction between transparency and the need for moments of secrecy in order to

establish dialogue. This tension runs through all the modes of ordering, and points to the work that is required in order to achieve 'openness and transparency':

> There are problems in describing what we do in things like stakeholder dialogue, especially in early parts of the programmes – although ironically it's about transparency and engagement and dialogue. But at the same time it's also something that you're not going to make much progress in unless you commit to a certain amount of 'not airing your washing in public' with the other organisations too early in the process. So *there has to be a certain amount of almost confidentiality in order to be transparent.*
> (Technical Manager, Monsanto UK, interview, 7 October 2002, emphasis added)

In this section I have focused on ways the transparency mode of framing has performed the 'accountable corporation'. Forms of public accountability have become the focus of social scientific investigation in recent years. In particular, the application of neo-liberal economic accounting techniques throughout business and public sectors has been critiqued (Power 1997, Strathern 2001). However, accountability is an older and broader political category than the focus on financial accounting and performance indicators suggests. In liberal democratic theory, public knowledge about the work of political institutions is at the heart of the functioning of democracy (Held, 1987). In this section, the publication and dissemination of peer-reviewed scientific research by Monsanto's scientists is presented as an important element in its performance of corporate transparency. In my interview with the Monsanto technical manager, he implied that this move to increase scientific publications was a response to public criticism of the company as secretive.

As Ezrahi argues, the construction of a political fact not only requires a particular commitment to liberal conceptions of science and politics, but it also requires appropriate institutional forums for the display and witnessing of these acts (Ezrahi, 1990). In this sense the public sphere is the consequence of the production of particular liberal democratic forms of institutional arrangement. Therefore, even though Monsanto's dissemination of scientific research may be motivated by narrowly defensive considerations, as suggested in the above quotations from my interview with the Monsanto manager, it nevertheless contributes to producing a public sphere in which corporations are held accountable. Other actors, such as the

UK Soil Association can use Monsanto's information as part of a process of making the company accountable for its technological innovations.

5.7 Conclusions

In this chapter, the public information campaigns of both DuPont and Monsanto have been explored in terms of a mode of framing the companies' relations with consumer-citizens: one that performs corporate transparency. This mode of framing relates to the governance of corporate biotechnology innovation in two closely interconnected ways: first, in terms of attempts to restore public trust in the company as a responsible innovator; and second in terms of making corporate innovation publicly legitimate.

Performing corporate transparency can be understood as a means by which both DuPont and Monsanto can communicate their trustworthiness to a sceptical public. If public mistrust in corporations is due to the perception that industry is arrogant and secretive, then if the companies can show that they have nothing to hide, trust can be restored. However, Brown and Michael (2002) have argued that there is a major flaw in the argument that transparency is a route to winning public trust. This flaw is a consequence of the problematic nature of transparency. How is anyone to believe that what they are being shown by the corporation is a complete picture of what is going on? As scholars in science and technology studies have argued, believing what one sees requires trust in the social and technical apparatus that produces that particular image. Therefore, in conditions characterised by public mistrust, any representation of corporate practices produced by the corporation itself will be just as subject to mistrust as any other corporate product.

An alternative way to understand the emphasis placed on transparency is in terms of the production of public legitimacy of corporations as innovators of biotechnology in the public interest. This approach is suggested by reference to the emergence of a new phase of liberal constitutionalism, as discussed in Chapter 2. According to this approach, the legitimacy of corporations as sites where technological innovation is centred depends upon the corporations themselves becoming accountable to a wider

public. And in order to be made accountable, the corporation and its activities must somehow become open to public gaze.

The transparency mode of framing employs two contradictory narratives of the consumer-citizen audience for the companies' public information campaigns. At times the audience for the performance of corporate transparency is cast as attestive witnesses, able to judge the company's scientific outputs and decision-making processes. Such consumer-citizens are part of emergent modes of corporate accountability. At other times, and often as part of the same initiative to achieve corporate transparency, the company's consumer-citizens are cast as ignorant and irrational. This narrative replays the 'deficit model' of the public understanding of science, which traces the root of public controversy to an irrational fear of new technology. According this model, if the public could be taught the scientific basis of GM technology and its regulation, then they would be reassured of its safety.

The performance of the corporation as staged by the transparency mode of framing is similar to that of the dialogical mode. If attestive consumer-citizens are able to hold corporate biotechnology innovation to account, and therefore repair the crisis of legitimacy, then the corporations have to be coherent actors whose actions are knowable. The choreography required to produce corporate transparency performs the highly complex multinational company as an agent, guided by a controlling mind embodied by its senior managers. This chapter illustrates that both DuPont and Monsanto use the transparency mode of framing to indicate that what they have been doing all along is worthy of public trust, and their greater emphasis on transparency is just a matter of communicating more widely the laudable actions of these companies. However, if this mode is to achieve greater legitimacy there is also, in the background, the implication that consumer-citizen witnesses of corporate transparency have some authority over the actions of the company.

The performance of biotechnology innovation is not determined by the transparency mode of framing discussed in this chapter. As is the case with the dialogical framing, aspects of the ideological use of transparency as a mode of achieving accountability suggest that biotechnology innovation is open to public scrutiny. However, as transparency is institutionalised by both DuPont and Monsanto, it performs a linear

model of innovation. In this model the corporations are the sites at which legitimate agbiotech innovation occurs, and they are authorised to speak for 'science' through their public information initiatives. This performs not only the uneven distribution of knowledge throughout society implied by the deficit model, but also an uneven distribution of the ability to know. The way that scientific knowledge is displayed suggests that the transparency mode of framing does not expect consumer-citizen spectators to learn about the science and thus become knowledgeable, rather they are in the position of being reassured that the companies have based their decisions on sustained scientific investigation, and can therefore be trusted to innovate GM technology.

Chapter 6

Practices of Public Relations: corporate constructions of public opinion

6.1 Introduction

In Chapters 4 and 5 I have described two modes of framing that have been adopted by corporations coping with controversy of GM foods. Both these modes operate by drawing on practices and discourses of democratic governance. The dialogue mode of framing refers to public participation in decision-making, and the transparency mode refers to processes of legitimation through institutional accountability. As I followed the agbiotech companies' engagements with public controversy I have repeatedly found that the companies were turning to public relations agencies for help. During the period from the first commercialisation of GM crops in 1996 these agencies have been given increasing responsibility for devising and managing public relations campaigns for the agbiotech industry. These techniques of public relations have shaped corporate engagements with GM controversies so significantly that they can be considered as a mode of framing, which re-performs the relations between the companies and consumer citizens.

The public relations mode of framing is defined by the techniques it employs rather than the effect it produces. Both dialogue and transparency modes of framing perform the relations between companies and consumer citizens through processes of making visible 'public dialogue' and 'corporate transparency'. The public relations mode of framing differs in that the techniques which define the mode of framing are made invisible. This said, at times the public relations mode also uses aspects of the dialogue and transparency modes, and both the dialogue and transparency modes use public relations tools. However, there are significant differences with the public relations mode of framing, which are explored in this chapter. The most important of these is that the identity of the individual companies is made less tangible through the

public relations mode of framing. The agbiotech industry is performed as a collective, and greater emphasis is given to public attitudes to the technology rather than to the corporation as a responsible innovator. These differences have important consequences for the patterns of biotechnology governance which the public relations mode of framing produces.

The empirical material on which this chapter is based focuses on the work of two public relations bodies established jointly by the leading agbiotech companies. The Council for Biotechnology Information (CBI) was launched in the USA and Canada in 2000, and two years later the Agricultural Biotechnology Council (ABC) was established in the UK. I explored the activities of these two bodies through following their public representations, which included advertisements, websites and stories in the news media in the UK and USA. In addition to these sources I carried out interviews with people involved in CBI and ABC.

In this chapter the public relations campaigns are analysed as sophisticated interventions by the agbiotech industry in the construction of public opinion. The public relation mode of framing employs techniques of qualitative and quantitative research to construct representations of public opinion, which it then seeks to influence. Central to this strategy of researching and changing public opinion is the operation of established news media in both the UK and USA. The differences and similarities between the approaches in the USA and UK illuminate the processes by which public relations techniques engage in a process of reproducing a public sphere in which technological innovation becomes an object of public opinion. The public relations campaigns emphasise emotions as underpinning public opinions, and hence seek to emphasise the affective presentation of the benefits of GM foods. This strategy is based on the suffering which can be alleviated by the commercialisation of GM crops. The public as consumer-citizen and the corporation as accountable, or socially responsible, are changed. Here the public are operationalised as 'public opinion', and the identity of the corporation is blurred into a virtual organisation that represents a collective industry perspective.

The following section introduces the CBI and ABC public relations campaigns in North America and Europe. Section 6.3 then discusses the ways in which the

techniques of public relations construct public discourse through attempting to control flows of information. In the USA television and print advertising talk directly to publics about the benefits of biotechnology, whereas in the UK, since the ill-fated Monsanto print adverts of 1998, the industry has had to adopt more indirect methods of communicating its message. Section 6.4 examines the importance of public opinion research to the agbiotech industry public relations campaigns. 'Public opinion' has long been an important object of social research in the service of governments and businesses. In section 6.5 I explore the emphasis placed by the public relations campaigns on suffering and emotional connections between publics, corporations and controversy over GM foods. I argue that this opens up a new space in which a politics of technological innovation is emerging. Finally, this chapter concludes with a discussion of how the public relations mode of framing performs the roles of the agbiotech industry and consumer-citizens in the governance of biotechnology.

6.2 Formation of an industry-wide public relations campaign

In 2000 the seven leading agbiotech companies set up an organisation in the USA to promote the benefits and safety of GM foods. Aventis CropScience, BASF, Dow Chemical, DuPont, Monsanto, Novartis, and Zeneca Ag Products all agreed to pool their resources in order to combat the potentially negative commercial consequences of public controversy that had sprung up in Europe. These companies had reached this consensus during meetings of their Presidents Advisory Group[38] held in 1999. In this section I introduce the public relations bodies set up in the USA and UK and I explain the rationale for their establishment, focusing on the particular role played by Monsanto. I discuss the role of the public relations agencies hired by the agbiotech companies, and I describe the difficulties faced by the agbiotech companies in agreeing a common public relations strategy.

The Council for Biotechnology Information (CBI) was launched on 3 April 2000 with a television advertisement campaign on the "promise" of biotechnology. CBI was run by a public relations agency, BSMG Worldwide, on behalf of the companies and it

[38] Smith, interview, 3 October 2002.

aimed to communicate to publics in the USA and Canada through its website, television and print advertising; developing relations with journalists and other potential allies; and by lobbying government. The companies agreed to spend $50 million a year for up to five years on CBI.

In 2002 the same agbiotech companies set up an equivalent organisation in Europe, Agricultural Biotechnology in Europe (ABE). The main difference between the way that the CBI and ABE are organised is that the budget for the European effort is much smaller because it does not run any advertisements.[39] The ABE is the name used at the EU level, but in each European nation in which it operates ABE has adopted a different name and an independent structure.[40] In the UK it is the Agricultural Biotechnology Council (ABC) and has it own steering committee made up of people working in each of the agbiotech companies. The public relations agency Webber Shandwick was hired by the agbiotech companies to run the ABE and each of its national manifestations. It provides ABC with a secretariat, and management decisions are taken by the steering committee, the chair of which acts as the ABC's spokesperson.

The public relations firms hired to run CBI and ABC brought with them experience and techniques not possessed by the agbiotech firms. One of the major tasks they accomplished in order to re-frame relations between the corporations and their publics was to work with the companies to launch new bodies to represent the agbiotech industry as a whole. The construction of these new bodies entailed a new performance of social actors and their agency in the context of biotechnology innovation. Whereas in discussions of public dialogue and corporate transparency in Chapters 4 and 5, the 'consumer-citizen' and the 'socially responsible corporation' were central actors in corporate responses to public controversy, the public relations bodies introduced new actors. Rather than performing the corporation as socially responsible, the public relations mode of framing deconstructs the individual company, and constructs in its place a single voice for the agbiotech industry. Thus, the dialectic of revelation and

[39] ABC also works with Cropgen, a group of pro-GM scientists based in the UK, funded through the same alliance of large biotechnology companies. It was set up in February 2000 with the specific aim of acting as a resource for journalists (Henderson, 2000).
[40] The ABE website has links to activities in Belgium, Denmark, France, Spain, Sweden and the United Kingdom, www.abeurope.info (accessed 9 April 2003).

concealment at the heart of corporate transparency discussed in Chapter 5 is re-ordered by the companies' public relations campaign.

The background to the foundation of CBI was the intensification of controversy in Europe as a result of Monsanto's public response to critics of GM foods. Up until the foundation of CBI in 2000 Monsanto had born the brunt of anti-GM foods campaigns run by environmental NGOs such as Greenpeace and Friends of the Earth. Monsanto's sense that other companies were not taking responsibility for making public arguments in favour of GM technology was one of the reasons that a collaborative campaign was launched. In an interview with me a spokesperson for Monsanto in the UK expressed his sense that the other agbiotech companies were not contributing sufficiently to arguments in favour of GM foods. According to his account, this meant that Monsanto was disproportionately exposed to the risks of becoming the focus of public criticism. He also recalled the large amount of his time that was taken up acting as a spokesperson for GM technology as a whole:

> None of the other companies were anywhere to be seen in all of this, and so we were the ones that everybody always came to for comments, and we just stepped up to the plate every time, like, you might say, lambs to the slaughter. It did mean I spent, oh, most of my working life in those days going to this meeting or that meeting as the invited example of the biotech corporate world, and so did many of my colleagues.
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

Not only did people at Monsanto feel that they were being expected to shoulder a disproportionate share of the burden of defending GM foods, but also other companies were seeking to minimise the risk to their own reputation from becoming a target of NGO campaigns. The public relations agency that won the contract to run the agbiotech campaign in Europe was Webber Shandwick. In an interview with me, an account director at Webber Shandwick referred to the justification of the collective industry effort in terms of ensuring that all the companies contributed proportionately to making the case for GM foods:

> The mechanism that worked for the majority of the companies for some years had been to let Monsanto stick its head about the parapet and to keep low.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

The sense that the other companies were enjoying a free ride at the expense of Monsanto was echoed by the Technical Manager at Monsanto. In the following quotation from my interview with him, he pointed to a second, equally significant, justification for the collaborative effort. The other companies were worried that Monsanto's strategy of vigorously defending their case for GM foods was misguided, as in the case of Monsanto's 1998 European advertising campaign discussed in Chapter 1. In this quotation the spokesperson alludes to the criticism that was being levelled at Monsanto by its fellow agbiotech companies:

> You couldn't see them for dust. We tried to get some of our partners in the industry to, you know, at least share the communication – even help us. If they keep saying we are doing it so wrong, then come and help us. It took a long time to find common ground.
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

The other agbiotech companies believed that Monsanto's lack of sensitivity to European public opinion led to Monsanto appearing overconfident about the benefits of GM technology and dismissive of any public reservations. This critique of Monsanto's approach, which was important in the emerging case for a collective industry campaign, focused on the concept of public trust. By presenting arguments that alienated public opinion in Europe, Monsanto undermined trust both in the company and also the technology it was promoting. Consistent with *Uncertain World*, the report sponsored by Unilever which investigated public attitudes to GM foods (Grove-White *et al.*, 1997), the public relations agency Webber Shandwick identified the 'body language' of the agbiotech corporation as critical in the formation of public opinion. The implicit argument in critiques of Monsanto's campaign is: 'if this company is so poor at reading public concerns over GM foods, how can it be trusted to responsibly develop and market the technology?' The Chairman of ABC, who came from Monsanto's competitor Syngenta, told me in an interview that Monsanto's approach had been "one of the biggest disservices" to the agbiotech industry. And according to the Webber Shandwick account director this emerging consensus was also shared by Monsanto itself (see Figure 6.1).

> [Y]ou know the old Monsanto days, I hate to say it but [saying] 'this [GM] is going to feed the world' was one of the biggest disservices ever done, it was horrible.
>
> (Smith, interview, 3 October 2002)
>
> They know it was disastrous, everyone knows it was disastrous, it was an absolute abomination. You had this high-handed organisation thrusting this new technology on you.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

Figure 6.1 Criticism of 'old' Monsanto's response to public controversy

The decision taken by the agbiotech industry during 1999 to cooperate in a public relations campaign suggests a particular framing of the European public controversy over GM foods. This corporate understanding was informed by the iconic example of the success of the campaign led by Greenpeace in 1995 against Shell's plan to dispose of the Brent Spar oil facility in the North Sea. Shell's plan had been approved by the British Government, but Shell had to back down in the face of consumer activism in other European countries campaigning against the deep sea disposal of Brent Spar. Shell changed its policy because of the costly threat to Shell's corporate image. The lesson learned by industry, and also their public relations advisers, was that it is not enough for companies to have government approval for a course of action. Public opinion now operates as a powerful actor mobilised by NGOs and expressed through the economic actions of consumers. The second important lesson, which was highly relevant to the agbiotech industry, was that negative public opinion in one country can influence corporate action in another country (Zyglidopoulos, 2002).

A UK spokesperson for Monsanto reflected in an interview with me on the advantages of a collective public relations campaign in the light of the vulnerability of individual companies. For him the significance of Shell's defeat over Brent Spar, what he referred to as the 'oil crisis', signalled the vulnerability of a company to a coordinated campaign by NGOs. The success of Greenpeace, according to the spokesperson, stemmed from their ability to "play public emotion", which by inference suggests that corporations had hitherto lacked this skill. Thus for him the argument for the collective agbiotech industry campaign rested in part on the industry's requirement to

themselves learn how to "play public emotion". He also pointed to the advantage of forming an "intangible organisation" which can represent the industry as a whole, leaving individual companies less vulnerable:

> Well ABC is one of the things you need. I guess it's a bit like going back to the tactics in times like the oil crisis – attacking Shell. Normally these campaigns, the organisations involved in campaigns, know how to play public emotion. They pick a single identifiable target, you don't attack the whole of the petroleum industry, because, let's face it, everybody likes putting petrol in their cars, or the vast majority of people. You're better off picking a big corporate, potentially demonisable target and exposing the billions of dollars they make every year and saying some nasty things about them. A nice identifiable, easy to loath target. From that point of view if you go out as a Monsanto you are always going to be on the back foot, if you go out as part of a more intangible organisation, which is the whole industry, then it's less [vulnerable].
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

The strategy of establishing an intangible organisation to reduce the risk of being targeted by anti-GM food campaigns is in direct contrast to the goals of the transparency mode of framing discussed in Chapter 5. The three different modes of framing all offer different ways for the companies to cope with the non-linear models of innovation that they have been confronted with by controversy of biotechnology. One aspect of the new uncertainties that faced the companies was the geographies of consumer-citizens' expressions of concern over GM technology. The agbiotech industry sensed that they lacked the experience and competence to handle the European public controversy and to ensure that public opinion in North America was not 'infected' with scepticism. The view that industry was vulnerable to NGO campaigns was cited as the reason for establishing ABC by the chemical industry magazine *Chemistry & Industry*. The feature article claims that the public relations skills deployed through ABC would help the industry respond to public controversy:

> The industry has started to respond to highly co-ordinated campaigns by environmental pressure groups and an extremely sceptical media through the ABC.
>
> (Chemistry & Industry, 2002)

In the years leading up to 1996, Monsanto had been accused by food producers such as Unilever and retailers of ignoring their concerns about the possible problems of introducing undifferentiated GM soya into the food chain (Doubleday, 1999). As

public controversy in Europe escalated during 1998 and 1999, Monsanto and the other agbiotech companies found that retailers and food producers in Europe were making commitments to remove GM ingredients from their food. Suddenly, competing representations of public opinion and their abilities to influence the construction of public opinion were central concerns for the agbiotech industry. In my interview with the Chairman of ABC he asserted that the agbiotech industry lacked the expertise to communicate with the wider public beyond their traditional customers in the farming community. He contrasted their experience with that of Unilever, one of the large food producers who had abandoned using GM ingredients in its European products during 1999:

> You know Unilever have 40 billion communications with their consumers every year through their products. We in the biotechnology industry, agriscience industry, maybe we're big, but there are 59 million people in the UK. How will we do it? It's not our expertise, it's not our area of comfort and it's a new thing.
>
> (Smith, interview, 3 October 2002)

BSMG Worldwide was the public relations agency hired to set up and run CBI. This decision was made at a meeting of the seven leading agbiotech corporations held at the end of 1999. According to a report in the online PR newsletter *Holmes Report* (2001), BSMG was charged with a brief to "get ahead of the public opinion curve" through a combination of public relations activities:

> The coalition asked BSMG Worldwide to quickly tackle five objectives:
> (1) create an overall strategy for a comprehensive North American public information program that would shape public opinion and public policy formation on food biotechnology,
> (2) help establish a formal structure through which the coalition of companies could make decisions and function,
> (3) develop and test communications messages through attitudinal research,
> (4) design and implement a public affairs and public relations campaign, and
> (5) create effective television and print advertising.
>
> (Holmes Report, 2001)

The first two objectives for BSMG Worldwide listed in the *Holmes Report* article depend on the agency's ability to facilitate cooperation among the seven agbiotech companies. The agency's role in bringing together the different companies is significant, given that each company was at a different stage in its development of GM products, and therefore had very different market shares to defend. The agency

has been able to help forge a collective effort among the competing companies through its claims to public relations expertise that was lacking within the industry.

The fact that the seven agbiotech companies decided to join forces on a public relations campaign of such strategic significance indicated the sense of crisis that was felt within these companies. The executive director of CBI expressed the joint commitment of the companies in terms of their commitment to biotechnology, which suggests that the fate of the technology itself rested on the companies' public relations strategy:

> These companies are fierce competitors. It is a very disparate group, from Europe and also US based. You have companies like DuPont that are diverse and others like Monsanto are very focused on biotechnology. There are many different perspectives to put it mildly. But though they are natural competitors, you have to ask what brings them together? What makes them invest their money? It is the belief in the benefits promised by this technology.
>
> (Thrane, interview, 22 February 2001)

For the individual agbiotech companies the CBI and ABC required the commitment of large amounts of time and money. The joint public relations effort also entailed risks associated with collaborating with competitors each of which had a slightly different agenda. Stephen Smith, Chairman of the ABC and senior manager of Syngenta UK, emphasised the difficulty of reaching agreement amongst the companies:

> The ABC has to be extremely careful not to enter into product specific or technology specific arguments that are linked to a single company... There was some degree of difficulty in getting common positions from, at that time seven, but now six major companies. All of which have slightly different strategic visions of biotechnology, access to certain different technologies. Some are nearer market, some are further away from market, some are US based.
>
> (Smith, interview, 3 October 2002)

An example of the difficulties the companies faced in reaching a consensus about the public relations messages related to pesticides. One of the principal arguments used in promoting the commercialisation of the current generation of GM crops is the claim that they require less pesticide use than conventional crops. This argument implies that conventional agriculture is damaging to the environment and that the use of pesticides is something to be avoided if possible. However all the agbiotech

companies are also producers of agrochemicals. The balance between promoting herbicide tolerant and insect resistant GM crops and protecting markets for pesticides is a delicate one, which plays out differently in each company. As the UK spokesperson said, Monsanto's position was different from the other companies as it had most at stake in the short term:

> Now it took us a long time, and I can tell you it's not easy to get a group of companies together like ABE for Europe or ABC. Because each of those companies have their own interests. We [Monsanto] happen to be the company that had the biggest area of crops being grown, which was also at the same time competing with some of their old technology... So, you know, trying to come up with a statement like, 'biotech crops reduce the usage of pesticides' is not very easy when your partners are pesticide companies.
>
> (Technical Manager, Monsanto UK, interview, 7 October 2002)

Whereas the dialogue mode of framing discussed in Chapter 4 emphasises the corporate in dialogue with public concerns about GM technology, the public relations mode is concerned with introducing messages about biotechnology into the public sphere rather than engaging in a two-way exchange. Establishing new public relations bodies representing the agbiotech industry as a whole also recasts the questions of transparency explored in Chapter 5. Rather than companies representing themselves as transparent, and exposing their decision-making processes to the outside world, the public relations campaigns make the specific companies invisible in the public sphere. In the process, the global scale of the companies is obscured by the construction of more localised bodies. ABC describes itself as a "single transparent and accountable voice for all crop biotechnology companies in the UK" (Agricultural Biotechnology Council, 2002: 1). The work of the public relations agency is central to the construction of the new "voice" for industry, and the concomitant reduction in visibility of the individual companies. As the Webber Shandwick Account director said to me in an interview, the success of the public relations firms in this work depends on their own invisibility:

> I think ABC provides the facility to enable industry to be more transparent – that is probably the best way of putting it. I mean as I mentioned before I am not a spokesperson for ABC, so it's not for me to be transparent, it's not for us as a secretariat to be transparent, but *we want to facilitate that transparency.*
>
> (Account Director, Webber Shandwick, interview, 12 June 2002, emphasis added)

Both the CBI and ABC work to present arguments for the benefits and safety of agbiotech products. These arguments are based in part on scientific claims, and in part on appeals to a cultural hope that technological advances will alleviate suffering. In presenting these arguments the agbiotech industry as an actor is often absent. The techniques of public relations as applied in this case universalise arguments about biotechnology, dislocating them from the specific context of their discovery and application. In this sense, the public relations campaigns work in opposition to the moves for greater corporate accountability evident in Chapters 4 and 5, both of which perform the corporation as the socially responsible innovator of biotechnology. The following sections explore how the public relations campaigns have worked in practice through the staging of the relations between public opinion and biotechnology in the media.

6.3 Public relations techniques of information management

When the leading agbiotech corporations agreed to fund joint public relations campaigns in North America and Europe they relied heavily on public relations agencies to run the campaigns. These agencies depended on their previous experience of managing clients' public relations; this experience is codified as techniques which can be applied for their current client. The approach adopted in the CBI and ABC campaigns have emphasised the importance of 'public opinion' to the success of corporate strategies to commercialise GM crops. In particular, they have focused attention on the relationship between representations of biotechnology in the public sphere and public opinion.

Chapters 4 and 5 have followed corporations as they responded to European controversy over GM foods by adapting their self-presentation in relation to different constructions of the public. The inclusion of public relations firms in the production of corporate presentations of themselves adds a new dimension to the translations between the agbiotech corporation, their publics and GM technologies. Public relations techniques add a sophisticated array of devices that bring together constructions of the agbiotech industry, of public opinion and a dynamic public sphere. The public relations campaigns script, test and calibrate the companies' key

messages about GM foods. In doing so these campaigns intervene in the production of a technological public sphere. This section explores the constraints that emerge from carrying out public relations campaigns in the different contexts of the UK and USA.

The agbiotech corporations' construction of public attitudes to GM foods in Europe as a 'controversy' is reinforced by the dominant news values of print and broadcast journalists, who tend to tell stories as a debate between two opposing sides (Gregory and Miller, 1998). Public relations techniques identify a 'crisis' as the conditions in which media reports of a story cast the industry in a defensive role and unable to respond adequately. In public relations theory and practice, crises are understood in terms of the production, flow and reception of information (Kernisky, 1997; Coombs, 2001; Guiniven, 2002). In this context, public relations agencies have developed tools to help companies cope. Public relations are said to be 'reactive' when having to provide information to the media in response to a story, and 'proactive' when the company is in a position to produce a news story that helps to present a message that promotes the company's interests.

An important contribution to codifying techniques of public relations has arisen from work in management studies under the rubric of 'strategic issue management'. An early and influential exponent of this approach defines it as: "A strategic issue management system (SIM) is a systematic procedure for *early* identification and *fast* responses to important trends and events" (Ansoff, 1980: 134, original emphasis). In public relations, the particular case of 'crisis management' has been given increasing attention. According to Coombs (2001), the proliferation of crises facing corporations is due to what he identifies as external challenges to business: "technology and stakeholders continue to create new crises" (Coombs, 2001: 89). In writing about strategies to handle crises, Coombs defines a crisis in terms of a dearth of information:

> Crises are information-driven. The crisis creates an information void that the crisis team tries to fill as quickly and as accurately as possible. Crisis managers must know how to collect and to disseminate information.
>
> (Coombs, 2001: 90)

The public relations construction of a GM crisis provoked by media controversy has at its heart a tacit model of how 'public opinion' is formed. According to this model

public opinion is an aggregation of individual public attitudes formed through exposure to information in the mass media. This linear relationship is assumed to describe the flow of information from the mass media to the public, who then use this information to form opinions. This model of public opinion constructs the figure of the public differently from the consumer-citizen of Chapters 4 and 5. The consumer-citizen is called on to participate in dialogue over corporate innovation, or act as attestive witnesses in processes of corporate accountability. In both cases the contribution of the consumer-citizen is their capacity as knowledgeable subjects, grounded in their lived experience as individuals and publics. The 'public' as holders of 'public opinions' are assumed by the public relations campaigns to be open to new information provided through the media. This approach emphasises public consumption of media information as a passive process, and citizen-like capacities to critically engage with the origins and substance of the information are marginalised.

The agbiotech public relations campaigns apply techniques which focus on media controversy and its effect on public opinion. In doing so CBI and ABC become intimately involved in the production of news about GM foods. To trace their activities is to chart a political economy of the production of news. This allows an exploration of the character and scope of a public sphere in which biotechnological innovation is debated. This section goes on to examine the objectives of CBI and ABC and the differences between the practice of these two organisations in the UK and the USA.

The objectives of the CBI and ABC

Both CBI and ABC have as their stated objectives to promote and contribute to public discussions about GM technologies. For CBI it is to "improve understanding and acceptance of biotechnology" (Council for Biotechnology Information, 2003a) whereas for ABC it is to "support and encourage fair debate surrounding the potential production of GM crops in the UK" (Agricultural Biotechnology Council, 2002: 1). The difference between the two objectives reflects the different understanding of public attitudes in the USA and UK. CBI's objective is formulated in the light of the assumption that US public opinion is either neutral or indifferent to the

commercialisation of GM crops. Whereas ABC understands public opinion in the UK to be hostile to GM foods. ABC's aim is therefore to re-open the debate in order to introduce industry's point of view (see Figure 6.3).

CBI's statement of objectives highlights the central premise of the public relations campaign: the right kind of public communications can lead to acceptance of GM foods. In the US context, CBI refers to the authority of science and the relationship between public understanding and societal acceptance of biotechnology (see Figure 6.3).

CBI:

The Council for Biotechnology Information was launched in 2000 by several leading biotechnology companies and trade associations with a clear vision: to improve understanding and acceptance of biotechnology by collecting and communicating balanced, credible and science-based information about this new tool that promises to contribute so many benefits to people all over the world.

(Council for Biotechnology Information, 2003a)

ABC:

abc represents a single transparent and accountable voice for all crop biotechnology companies in the UK in response to the public demand for more open and accessible information on genetically modified (GM) crops.

The agricultural biotechnology council (abc) has been created to support and encourage fair debate surrounding the potential production of GM crops in the UK.

(Agricultural Biotechnology Council, 2002: 1)

Figure 6.3 Formal objectives of CBI and ABC

In the case of CBI in the USA, the problem is understood in terms of a lack of public awareness of the commercialisation of GM crops. In my meetings with people in the USA from DuPont, Monsanto and CBI I heard repeatedly about a fear that controversy could spread from Europe like a contagion to infect US public opinion. A strategy to cope with this possibility is being followed by CBI. This attempt to 'inoculate' US public opinion is based on efforts by the agbiotech industry to define the terms of the debate before any anti-GM foods campaigns are established. The

print and television advertising strategy of the CBI is reported to be part of this broader strategy to "inoculate the industry against negative attacks":

> BSMG Worldwide had seen first-hand the effectiveness of the anti-biotech campaign in Europe, and the mistakes that were made by industry in trying to counter it. Research conducted by BSMG Worldwide's KRC Research showed that North American consumer audiences – who had little knowledge of and no clearly defined opinions yet about biotechnology – would be vulnerable to the same tactics successfully used by anti-biotech critics in Europe.
>
> (Holmes Report, 2001)

According to a DuPont press release announcing the launch of CBI on 3 April 2000, the public relations campaign would be made up of a seamless web of information provision techniques (DuPont, 2000c). The three main avenues the press release mentions are a new website, print and television advertising and a CBI brochure. The *Holmes Report* claimed that the first year of the industry's collective public relations effort coordinated by BSMG had been very successful. The article reported that CBI had set up a website and was running cyberPR[41] drives to encourage people to visit the site. By May 2001, just over a year after its launch, CBI had sent out 100,000 brochures and 1,200 information kits to representatives of media organisations (Holmes Report, 2001). According to the *Holmes Report* article, in addition to the public information campaign, BSMG Worldwide was hired to disseminate information and resources to other supporters of biotechnology so that "information would be made available to the public not only by the biotechnology industry, but through a variety of academic, scientific, government and independent, third-party sources." The programme was also designed to be reactive, setting up mechanisms for the rapid rebuttal of negative stories as and when they appeared in the mainstream media.

The CBI website is a central component in achieving its goal of informing publics in North America about the benefits and safety of agricultural biotechnology. According to the "About Us" section of the CBI website the credibility of the information

[41] CyberPR is a collection of techniques to encourage traffic to certain websites (and away from others). This, now standard component of public relations, includes encouraging other websites to provide links to the website; and writing the website content and electronic address in such a way as to encourage search engines to give a high priority to the site in response to relevant searches.

provided through the website, depends in part on the medium of the internet itself, providing as it does a means to link together different sources of information:

> Through our award-winning Web site, the Council for Biotechnology Information is committed to bringing you the facts about these exciting new developments – complete with footnotes and hyperlinks to scientific research and other information. That's our pledge to be a credible source of information about plant biotechnology.
>
> (Council for Biotechnology Information, 2003a)

Given that the CBI is reasonably upfront about the fact that it is founded, funded and run by the large biotech corporations the question remains, why would people consider the information provided by CBI to be credible? The stories about biotechnology on the website are reassuring about any safety concerns, and offer endless examples of the kind of potential the technology promises for the future. The unrelentingly rosy perspective of the CBI website has attracted a few words of caution from commentators such as the former vice president of communications at the agroindustry trade group, the American Crop Protection Association, Christopher Klose. Writing in *The Washington Post* at the time of the StarLink crisis,[42] one of the USA's greatest GM foods scares, Klose wrote:

> [CBI's] internet home page offers a veritable Potemkin Village of positive, reassuring information. Articles such as "Biotech Corn in Food No Cause for Concern" beckon the curious and the concerned. But after a nationwide recall of taco shells and a shutdown of Kellogg cereal production over "escaped" biotech corn, something more than routine reassurance is called for.
>
> (Klose, 2000)

Despite the sceptical comments of people like Klose, CBI's campaign in the USA continued to depend heavily on its website and print and television advertising. These techniques were not used when ABC was set up in the UK in 2002. The reason for this was that the public relations agency Webber Shandwick had found in its research that the agbiotech industry was not trusted by the UK public. ABC focused its attention on how the 'GM foods debate' was covered in the media. To achieve better coverage, ABC facilitated media access to spokespeople for the agbiotech industry, and at the same time it tried to encourage the media to cover stories in which

[42] See Chapter 1 for a brief discussion of the Starlink crisis of 2001, in which maize that had not been approved for human consumption was found in food products in the USA.

agricultural biotechnology would appear in what ABC hoped would be a more sympathetic light. This construction of the problem accords with Coombes' (2001) description of crisis management in terms of the management of information flows. Stephen Smith, of Syngenta, UK and ABC Chairman, talked about the importance of the collective industry body in terms of getting the industry's voice heard in the media:

> Why it [ABC] was so appropriate in the UK was that clearly there was a vacuum, and misery thrives on a vacuum. And whenever there was a comment required from industry the media and other groups had nowhere to go. They came through to individuals such as myself, or others, but clearly there was no focal point. And to wit, we felt we had to be transparent, we had to be accountable, we had to be visible, we had to have a human face.
>
> (Smith, interview, 3 October 2002)

However, Weber Shandwick does more than just make sure that representatives from industry are given a voice in the media, it also trains that voice. What counts as the 'right comment' for industry to make is a function of the wider public relations strategy, which seeks to present the agbiotech industry as respectful of a range of perspectives on the risks and benefits of GM foods:

> It might just be a response letter in *The Times*, it might be an interview piece where you've got an issue that's raised by Greenpeace or Friends of the Earth and they obviously phone up one of the industry people for a quote and time and time again it's come across as being very arrogant, very you know 'shut up, you don't know what your talking about' actually, in all honesty. And so I think it's hopefully sort of a monitoring role that we can perform to make sure that the right comment is made, in terms of 'look you know we are *just* the industry, we don't know it all, we haven't always got it right, but we do think there's another side to this.'
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

The second strand of ABC's strategy was to promote positive stories about GM technology in the UK media. Not only did Webber Shandwick's research with focus groups find industry was not trusted, it found that out of governments, environmental NGOs, industry and journalists, journalists were the most trusted on the issue of GM:

> In the UK, journalists came out on top of the league of those who people trusted to communicate messages on this subject.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

Taking account of the finding that journalists are relatively trusted sources, the ABC's strategy was to contribute to public debate indirectly, by providing stories to journalists and other parties. ABC worked to promote positive coverage of GM issues in the UK press by providing 'information subsidies' to journalists, the classic form of which is the press release.[43] Press releases work by reducing the amount of time that busy journalists need to spend in researching and preparing a story through providing a pre-packaged story. However, the ABC goes beyond providing press releases and seeks to build relationships with journalists who will then turn to the ABC when they need an industry source or perspective, and who will be more receptive to ABC's attempts to generate positive news.

In an interview with me, the Chairman of the ABC, Smith, provided an example of an instance when ABC would benefit from a journalist or other non-industry actor presenting industry's case. He said that one of ABC's goals is to counter 'myths' about the risks posed by GM crops. One such myth that Smith referred to is the harm caused by insect resistant GM maize to monarch butterfly caterpillars, however, "generally industry can't be seen to do that because they say – 'well you would say that anyway'" (Smith, interview, 3 October 2002). The answer is to get a story into the media so that the journalist will report on findings that help to undermine claims that GM crops pose a threat to monarch butterflies. This goal is ABC's principal operational objective, which it achieves by remaining invisible in the public sphere:

> ABC doesn't have a huge profile, it's working behind the scenes, it's trying to really be a tool for commentators such as the media. I mean that's very much what we are here to try and provide. To build relationships with journalists and seek for them to use us as a pool, as a resource, if you like, for when they write stories.
> (Account Director, Webber Shandwick, interview, 12 June 2002)

According to the Webber Shandwick account director, the agency also tries to be more active than just operating as a resource for journalists. It works to promote particular stories that will introduce topics in the context of which ABC believes that UK public opinion is more receptive to GM technology. An example might be that rice can be genetically modified to increase its beta carotene content, which is a

[43] In the UK for example, the daily output of newsprint has nearly doubled between 1984 and 1994 during which time the staffing levels of newspapers has remained almost constant (Gregory and Bauer, 2002).

precursor to vitamin A. The argument then runs that GM technologies could be used to the benefit of malnourished children in countries that suffer from high rates of child blindness caused by vitamin A deficiency. Many people in the agbiotech industry believe that potential benefits to the developing world are "soft ground" in UK public opinion. A news story that introduces this topic – such as an agbiotech company agreeing to share its research on the rice genome to this end – is known as a "message platform":

> The major thrust of our activity going forward at the moment is driven by a need to develop a stronger debate within the press. So we have a number of key issues which developed as a result of the research undertaken last year where we feel there is some soft ground, for want of a better word, to move forward the debate in the media. So we're working with journalists who are relevant, I can't give you too much information on this because some of it is a little bit sensitive. But we are, if you like, creating vehicles whereby these issues that we believe that people are relatively soft on will be discussed in the press. So it's really trying to create message platforms, as we describe it.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

The public relations mode of framing performs consumer-citizens as holders of public opinions. The strategies of public relations techniques are predicated on the assumption that these opinions are not deeply held, and can be changed in the light of new media messages. In this frame, the public is accorded some agency in the way that different messages are weighed-up in the process of public opinion formation. The public relations mode also assumes that the effectiveness of a given message in influencing public opinion depends on the extent to which the public trust the information's source. The following section illustrates some of the techniques used by CBI and ABC to encourage positive media coverage of GM foods.

CBI and ABC in action

The public relations mode of framing relations between corporate agbiotech innovation and public opinion is not as superficial as popular uses of the term 'PR' would suggest. The expression 'it's only PR' is often used to suggest that 'nothing has *really* changed beneath the surface image', however, as this Chapter illustrates, techniques of public relations require significant changes in the operations of

agbiotech companies. The shifts in corporate approaches to public debates about biotechnology entailed by the strategies of CBI and ABC require changes in practices, alliances, and configurations of corporate strategy. Two cases that emphasise the use of scientific research as part of the public relations mode of framing concern controversy about monarch butterflies in the USA and the outcome of the UK Government's assessment of the Farm-Scale Evaluations.

As outlined in Chapter 1, entomologists from Cornell University published a letter in the May 1999 issue of *Nature* reporting that laboratory tests had shown that pollen from *Bt* maize was toxic to monarch butterfly caterpillars (Losey, 1999). This result was quickly picked up by critics of GM agriculture in the USA, and the charismatic quality of monarch butterflies ensured that the US media reported the story (Cummins and Lilliston, 2000; Rampton and Stauber, 2002).

The agbiotech industry's response to the monarch butterfly story followed two stages. The first was to disseminate a critique of the Cornell research. To this end Monsanto published a position paper on 15 February 2000 titled "Butterflies and Bt Corn Pollen: Lab Research and Field Realities", which stressed the limitations of extrapolating from 'artificial' laboratory experiments. The second stage of response was a series of further scientific studies carried out by scientists from the agbiotech industry and by US Department of Agriculture (USDA) scientists, who were funded by industry. These tests reported that monarch butterfly caterpillars in the field were not exposed to significant levels of *Bt* maize pollen.

The contours of the industry response to the monarch butterfly story can be found on the CBI website. In a prominent article, "Biotech and Butterflies", CBI points out the limits of extrapolating from laboratory experiments and it explains the difference between the laboratory toxicity studies and field conditions (Council for Biotechnology Information, 2003b). The article also gives details of the study carried out by industry scientists together with the USDA's Agricultural Research Service (see Figure 6.4). In addition, the website has other articles on the same topic, such as "Response to Butterfly Controversy: a Model in Assessing Biotech Products" and "Bt Corn and the Monarch Butterfly" which covers the same ground but with more

references to scientific literature (Council for Biotechnology Information, 2003c; 2003d).

> [W]hen Cornell University researchers conducted their 1999 study, they did not attempt to duplicate real-world environmental conditions. Rather, they used only a small number of caterpillars and gave them no choice but to eat leaves coated with a thick layer of Bt corn pollen.
>
> (Council for Biotechnology Information, 2003b)
>
> The findings revealed that monarch caterpillars have to be exposed to pollen levels greater than 1000 grains/cm^2 to show toxic effects. In addition, the study also found that corn pollen levels on milkweed leaves in corn fields averaged only about 170 grains/cm^2 – well below the toxic level.
>
> (Council for Biotechnology Information, 2003b)

Figure 6.4 CBI on "Biotech and Butterflies"

This case also illustrates how the CBI website operates to intensify processes of news production in the public sphere by providing information subsidies to journalists and by archiving news stories that carry CBI's key messages and making them accessible to visitors to its website. The case of the monarch butterfly story is illustrative of how the CBI website works. There are four main sections that can be accessed from the homepage of CBI's website, each defined by its target audience: "Consumers"; "Farmers"; "Journalists" and "Teachers and Students". The sections for consumers, farmers, teachers and students contain links to news stories that have appeared in the news media, or to reports from third party organisations. Whereas the section for journalists is made up of information subsidies designed to encourage them to write the stories that can then in turn make up the content of the other three sections.

In the UK, ABC's profile as a source of news stories is lower than that of CBI. However, it does engage in an analogous process of shaping the coverage of GM technology innovation in the public sphere. The case of Monsanto funded research into the ecological impacts of growing herbicide tolerant sugar beet in the UK provides a story of ABC's involvement in the adoption by agbiotech corporations of a public relations mode of framing public debates about GM agriculture. During 2002 the agbiotech corporations hired a new public relations firm to run the ABC.

According to a report in *PR Week*, the work of the ABC was then focused more tightly on presenting the industry case in the policy and wider public debates that would accompany that publication of the results of the UK Farm-Scale Evaluations (see Chapter 1):

> A three-year independent trial of GM technologies – the Farm-Scale Evaluations programme – is due to end next summer. The controversial trials – which have taken place at 200 sites – will have a 'very significant influence on the GM debate', according to Smith.
>
> Lexington's remit will be to present the ABC's case to 'regulators, legislators, retailers and consumer groups', among others, said ABC chairman Stephen Smith, who denied the ABC was an organisation engaged in lobbying.
>
> An information drive to inform the public about GM technology will take place when the trial results are unveiled.
>
> (PR Week, 2002)

The ABC brochure *New Choices* can be read as an early intervention in public debates about the results of the Farm-Scale Evaluations (FSEs) (Agricultural Biotechnology Council, 2002). The brochure explains that the trials were agreed in 1998 between the UK Government and the agricultural industry. It goes on to describe the trials, which were designed to compare the ecological effects of growing GM herbicide tolerant maize, oilseed rape, and sugar beet with their non-GM equivalents. The brochure then argues that GM herbicide tolerant crops promise benefits for farming and the environment. It claims that "early indications seem promising" (Agricultural Biotechnology Council, 2002: 15). The brochure lists benefits to farmers from less frequent spraying and greater flexibility in the timing of herbicide application; and it lists benefits to the environment from allowing weeds to grow bigger before applying herbicide, allowing for greater biodiversity.

The early evidence referred to in the *New Choices* brochure was a Monsanto funded trial looking at GM herbicide tolerant sugar beet at the UK Biotechnology and Biological Sciences Research Council's Broom's Barn Research Station in Suffolk. This trial was also used by Webber Shandwick to show journalists and other 'opinion leaders' an example of GM technology "in the making":

> We are organising a series of visits to a research station called Broom's Barn where they are undertaking quite a lot of research on GM sugar beet. We are organising some visits there for MPs, opinion formers, journalists. So that people can actually go and have a look at GM technology in the making.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

As with the CBI website, the ABC site provides links that are designed to facilitate the circulation of news of the Broom's Barn research. Prominent links are provided to the academic article in which the research results were published: "A novel approach to the use of genetically modified herbicide tolerant crops for environmental benefit", which appeared in the *Proceedings of the Royal Society* (Dewar *et al.*, 2003).

In comparison with the CBI website, the ABC site is small. For example the "News Articles" section had links to only five articles.[44] Of these, two are news media stories covering the Broom's Barn research on the day it was published. The third link is to the text of a speech given by the president of the Royal Society, Robert May, available on the *Guardian* website. In this speech, given on 11 February 2003, May called for the public debate in Britain to include discussion of the "potential benefits of GM crops, as well as the possible risks". Referring to the Broom's Barn ecological research May said:

> We are now beginning to hear more about the potential benefits of applying GM technology to the production of crops. There have been recent scientific papers about the possible benefits to wildlife of growing GM sugar beet.
>
> (May, 2003)

Thus the work of the ABC can be seen in the intensification of the media coverage of the Broom's Barn research. As illustrated in Figure 6.5, the news coverage of the research was broadly positive about the potential of GM beet to benefit farmland birds. All the news stories mention that Monsanto funded the research (apart from the article in *The Times*, which must have been based on leak as it appeared two weeks before the publication date of Dewar *et al.* (2003)). Many of the articles also found critical voices who urged caution about drawing conclusions for GM agriculture as a whole on the basis of these results.[45]

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[44] This was the case at the time I carried out a survey of the ABC website on 9 April 2003.

[45] Both Greenpeace and Friends of the Earth published press releases on the day the Broom's Barn research was published. These criticised the research using exactly the same argument that Monsanto had used to undermine the Cornell paper on monarch butterflies, as discussed above.

GM crops 'will help wildlife'
Farmers who plant some genetically modified (GM) crops could help endangered species to thrive, UK scientists believe.
Alex Kirby, *BBC News On-line*, 15 January 2003

GM crops 'are helping to save the skylark'
Creative use of genetically-modified crops could bring back declining farmland birds such as the skylark, according to a study to be used in a Government assessment of whether to give the go-ahead to GM crops.
Charles Clover, *Telegraph*, 15 January 2003

Scientists grow 'bird-friendly' GM sugar beet
Researchers experimenting with genetically modified sugar beet have found a way to keep yields high while providing cover for nestling skylarks, lapwings, partridges, and other wild birds.
Tim Radford, *The Guardian*, 15 January 2003

Figure 6.5 Examples of press coverage of Broom's Barn research
See also *The Times* (Henderson, 2002); *The Independent* (Connor, 2003); *Financial Times* (Mason, 2003) and *The New Scientist* (Coghlan, 2003)

Public relations agencies are only successful as long as they remain in the background and none of the press coverage of the Broom's Barn research mentions the ABC, Webber Shandwick or Lexington. It is therefore difficult to attribute the coverage of the Broom's Barn research to the ABC, although the ABC will certainly have considered the positive coverage a success. The Webber Shandwick account director told me that the quantity and content of media coverage is one of the main indicators they use to judge the success of their public relations work.

The stories of the monarch butterfly caterpillars and the 'skylark friendly' GM sugar beet illustrate the close relationship between scientific research and publicity. The industry bodies, CBI and ABC, and the public relations agencies with which they operate, intensify the relationship between the corporations, the technology and the public sphere. This intensification is used to strategically structure the stories that are covered, and who reads them in order to promote message platforms that can support media coverage of key messages in areas where public opinion is soft. At the heart of the strategy is the category of 'public opinion'. How this category is constructed, and

brought into the public relations mode of framing is the subject of the following section.

6.4 Reporting public opinion

The phenomenon of public opinion has played a central role in the development of the public relations industry. In the 1920s when Barneys set up his agency in the USA the systematisation of public relations strategies rested on the emergent ability to measure public opinion. These techniques were used both to define the problem to which public relations were the solution, and to measure the success of particular techniques. Osborne and Rose point to the development of representative sampling as the key to constructing the social phenomenon of public opinion through questionnaire surveys (1999). They argue that the technique of polling not only creates the measurable phenomenon of public opinion, but also the political idea that there is such a thing as an opinionated public.

The construction of public opinion depends on the development of social science techniques of representative sampling and questionnaire surveys. However, it also requires a political economic context in which agency is attributed to the phenomenon of public opinion. In the political culture of twentieth century USA, with its commitment both to ideals of liberal democracy and techniques of quantification, public opinion surveys are powerful representations of the public. The Roper Centre[46] claims that such surveys can provide a more accurate representation of the public than the traditional political institutions of government:

> Public opinion polls have a natural appeal in a democratic society. While many political figures claim to speak for the people, when they are done well, public opinion polls let the people speak for themselves. At its best, polling can amplify the public's voice so that it may be heard over the clamor of special interests.
>
> (Roper Center, 2003)

[46] The Roper Centre was founded just after World War Two by Elmo Roper and began as a publicly accessible library of public opinion polls carried out by both Roper and Gallup and now compiles survey data carried out around the world.

For the agbiotech industry, the public relations campaigns construct public opinion in three different ways. First, CBI and ABC are directly engaged in identifying public opinion through surveys and focus groups. This research is used to characterise the state of public opinion and to test the impact of particular communication strategies on public opinion thus defined. Second, as I have argued in the previous section, CBI and ABC work to influence public opinion by promoting particular stories in the media. Third, CBI and ABC devote considerable energy to representing public opinion in the light most favourable to the industry's arguments. This third form of construction implicitly acknowledges that public opinion is a slippery category, and that the relationship between public opinion about GM foods and the commercial success of the agbiotech companies is not straightforward.

The representation of public opinion is a crucial element in the campaigns of both CBI and ABC. As Justin Lewis argues: "discourses *about* public opinion are as integral to the cultural form as the polling data itself" (Lewis, 2001: 73). The pattern followed by the establishment of both CBI and ABC was that the public relations agency first carried out public opinion research to define the problem which these campaigns were to solve. CBI and ABC also publicly reported the results of their initial research, although in the case of CBI the research itself was not reported in detail. However, CBI does highlight one of the conclusions of this research, which suggested that public opinion would respond favourably to a public relations campaign targeted at introducing US publics to the benefits of GM technology:

> The council [CBI] is committed to addressing concerns by deploying the best scientific research and other information in credible and understandable ways. Our research tells us that the more people learn about biotechnology, the more they will welcome it into the marketplace.
>
> (Council for Biotechnology Information, 2003a)

CBI presents what it is doing in terms of providing information to the US public. When talking about this information, the CBI stresses its scientific basis as a guarantee of its credibility. This mode of educating the public is a manifestation of the deficit model of the public understanding of science discussed in Chapter 5. In an interview with me, the Executive Director of CBI drew a distinction between the

situation in Europe where there is a fundamental breakdown in the public legitimacy of agbiotech regulation, and US public opinion, which is more open to education:

> In Europe you have to rebuild confidence in the regulatory authority whereas in North America we have some folks who are convinced by the benefits of the technology, and some folks who no matter what evidence they are given will always be against it. And then you have the large grey area in the middle. That's who we are trying to educate.
>
> (Thrane, interview, 22 February 2001)

Webber Shandwick carried out public opinion research throughout Europe during 2001. Given the marked differences between the extent of public controversy over GM foods in Europe and North America, the research and conclusions drawn from it were quite different from that carried out by CBI. The account director at Webber Shandwick emphasised the importance of research in shaping their strategy:

> Research was incredibly important to us in actually establishing where the debate lay. We undertook both quantitative and qualitative research, with more emphasis on the qualitative. We had a number of focus groups of different social classes and different geographic areas. We tried to interview people and really get to the bottom of where their concerns lay, which was extremely useful in helping to shape our response.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

This qualitative research carried out during 2001 provided Webber Shandwick with the support for developing the ABC's communication strategy. Their analysis was that scientific rationality does not provide legitimacy for claims about the risks and benefits of GM technology. In coming to this conclusion, the public relations agency further validated its own expertise in producing and communicating persuasive messages. In sharp contrast with CBI in the USA, Webber Shandwick's account director pointed to findings of public opinion research which showed that a scientific account of biotechnology would not address public concerns. Rather, the research argues that the agbiotech industry should be presenting GM technology in softer focus, emphasising its continuity with traditional methods of selective breeding:

> Many people had said to us in the past what the industry needs to do is to tell people about these wonderful products that are going to come out as a result of GM technology. But as soon as you sit down and talk to real people about 'well how do you feel about having a vaccine in a banana?' Sheer horror!... forget it,

> you're on a hiding to nothing, you're making the situation worse by talking up some of these kinds of products.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

The account director suggests that the kind of message that the focus groups responded to was:

> talking about 'look, all we're actually really doing is changing a plant in a way that breeders have changed plants for donkeys years, we are just sort of side stepping a bit of the breeding programme and just making a piece of corn stronger, healthier, less prone to disease.' People somehow don't find that nearly as threatening or as frightening.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

The launch of ABC was marked by the publication of its brochure *New Choices, New Challenges, New Approaches* (Agricultural Biotechnology Council, 2002), which is structured around the reporting of a telephone survey of a representative sample of 1006 adults from the UK during December 2001. The Chair of ABC, Stephen Smith, commented that the survey provided the new organisation an entry point into a debate that was already well-established in the UK. In the following quotation from my interview with him, Smith expressed the sense of vulnerability felt by the agbiotech industry when having to engage with public debate. According to Smith the publication of the brochure, which reports the results of the public opinion survey, provided a reassuring prop for the agbiotech companies:

> I think the first thing the document did was actually establish that ABC existed, and it gave them a rationale, it gave us a rationale to exist. Given that if you think in this debate we are all swimming around in a fairly deep sea and nobody can really put their feet on the bottom. So we view this as a sort of a raft, that can be placed in the water then we can all swim up to it and hold on with one hand and we can take some time to say 'hey, you know, now we can have some sort of reasoned debate and discussion'.
>
> (Smith, interview, 3 October 2002)

Given the situation of public opinion in the UK as understood by ABC, the project of this organisation was not to convince people of the benefits of GM technology, but to achieve "public apathy":

> Our objective – and obviously this is a little flippant – is to achieve public apathy. We are not going to get 59 million people marching on Downing St. saying 'we demand GM food.' Are we? But they are apathetic toward a myriad of technologies because they believe they are either proven to be safe because they are known, or that somebody else has looked after the regulatory process, and legitimised it.
>
> (Smith, interview, 3 October 2002)

The ABC introduces its *New Choices* brochure with a statistic from the telephone survey it commissioned. The poll asked people if "they felt they did not know enough about GM foods" (Agricultural Biotechnology Council, 2002: 4). The results of this question were used to justify the attempts by the agbiotech industry to undermine the significance of negative public opinion in the UK. As the Chairman of ABC said to me in an interview, it suggested to him that public opinions were not based on well reasoned arguments, but were picked up from the anti-GM campaigns of some NGOs and what Smith repeatedly referred to as a sensationalist media:

> Then we did the UK survey... which clearly gave us our remit because the first question found 66 per cent of people didn't have enough information to form an opinion – didn't know enough. That does sort of negate the remainder of their answers. Which are opinions formed probably more – take this with a pinch of salt, I don't really mean this – but more on being infected with a position as opposed to actually developing one, if you understand me. It's a bit like a second-hand suntan – if you read or see headlines constantly you adopt an opinion.
>
> (Smith, interview, 3 October 2002)

In publishing the *New Choices* brochure, ABC was engaging in the third form of public opinion construction – intervention in media representations of public opinion. Public relations techniques that produce and disseminate representations of public opinion engage in public discourse in various ways. The uses to which they are put are based on an understanding that public opinion is more than the aggregation of public attitudes through opinion polling or the interpretation of focus group discussions. These techniques intervene in the processes of representing public opinion. In so doing, the public relations bodies attempt to influence the ways that public opinion shapes the political economic context for innovation. ABC promoted particular media representations of public opinion to actors such as decision-makers in government, retailers, food producers, and to 'third party' NGOs, scientific societies and media organisations. ABC also encouraged the reporting of favourable public

opinion as a way of reassuring people about agbiotech. In this sense ABC is holding up a reassuring mirror to public opinion. There is also a more tactical use of opinion poll results, which takes advantage of the news values accorded to public opinion data in the UK and USA. ABC can use discussion of public opinion results as a 'message platform' for stories that it would like to see reported.

An example of how public opinion surveys are used to communicate particular messages is provided by Webber Shandwick's account director. She talked about how message platforms were developed to introduce a specific topic into mass media discussion. To illustrate this point, she gave the example of a plan which ABC had abandoned because the UK National Farmers' Union had carried out a similar survey before the ABC plan could be executed. The goal of this approach had been to introduce 'soft' topics on which public opinion had not already become entrenched. In this case the topic was the economic plight of farmers, and the possibility that GM crops might assist. To do this a public opinion survey was commissioned which asked people to identify which crops were grown in the UK:

> The idea is really to expose people's ignorance, not in an aggressive way at all, but just to say there are some problems here in terms of people's true understanding of what happens in the countryside, what kind of crops the UK grows. Then tying that back to the GM debate by saying that we want people to understand better not just how agriculture works but also the benefits that GM can therefore bring the agricultural community, particularly at a time when it's been pretty badly hit, as it has been recently, and the economic advantages that GM crops could provide.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

Despite the differences between public relations bodies' characterisation of public opinion in the UK and USA, the uses to which public opinion research at CBI are put are similar to those at ABC. For example, the section for journalists on CBI's website highlights an article posted in November 2002 about the results of a public opinion poll. Respondents were asked how valuable they considered a list of twenty possible GM foods being researched at that time. The poll found that "cancer-fighting tomatoes" was rated the most valuable example of GM research by the majority of respondents.

The story illustrates how CBI is engaged with constructing public opinion at multiple moments. What emerges through this example is that public relations techniques seek to reproduce the public sphere through practices which align the resources of the agbiotech industry with pre-existing contours of public discourse. The story assumes an understanding of opinion polling and its significance. Credibility is claimed by reference to the company that carried out the survey, Roper, and the sample size, 1000 adults. The opinion poll survey can then act as a reliable representation of US public opinion (see Figure 6.6).

Cancer-Fighting Tomato Tops America's 2002 Best in Biotech
Consumers select top five biotech advances of the year.

WASHINGTON (Nov. 11, 2002) – The prospect of a cancer-fighting tomato has been named the top development in food biotechnology in 2002, according to a Roper survey of 1,000 randomly selected American adults. When asked which publicly reported development in food biotechnology during 2002 was considered most valuable, two-thirds of respondents selected a research program that is enhancing tomatoes with a higher quantity of lycopene, an antioxidant believed to help fight cancer. The tomato is currently undergoing field tests.

After ranking the top developments in food biotechnology, six of every 10 respondents said they support the use of biotechnology in agriculture, while two out of every 10 were neutral and two out of every 10 expressed opposition.

"It is these types of advances through biotechnology that can make our foods more functional and truly benefit the healthfulness of people over the long-term," said Mary Lee Chin, a registered dietician who is a nationally recognized expert on nutrition trends... Chin said that food biotechnology is hitting its stride after 20 years of development and six years of commercially planted varieties that first emphasized managing pests, such as insects and weeds. "This year's top advances in biotechnology represent a shift in the focus of plant biotechnology beyond pest management," Chin said. "More and more, biotechnology is moving toward products that will offer direct benefits to consumers."

(Council for Biotechnology Information, 2003f)

Figure 6.6 CBI's "Cancer-fighting tomato" story

The article also reports that having ranked the most valuable GM food development, sixty per cent of respondents said that they supported the use of biotechnology in

agriculture. Here CBI is using a strategy that presents public opinion as favouring GM foods. This representation can speak to decision-makers, and can also be fed back into the public sphere as a representation of public opinion. This latter goal depends on the linear model of public opinion formation in which members of the public reach opinions through information carried by the media. CBI, like ABC, holds up a mirror to public opinion that offers, from CBI's perspective, a flattering reflection of public attitudes to GM foods.

The "cancer-fighting tomato" story also acts tactically as a platform for the message that GM research is producing foods that will offer health benefits for consumers. The opinion poll, which speaks for "American adults", is joined by the professional expertise of the dietician, who further spells out the significance of the findings in terms of the benefits to consumer diets from GM (see Figure 6.6). The article ends with a note that CBI funded the Roper survey, with links to more information on the GM tomato research and other uses of biotechnology to enhance the nutritional quality of foods.

This article was picked up by numerous news outlets in the US. It ran on the *PR Newswire* (2002), a service that distributes press releases, and also on the specialist *SeedQuest News Releases* (2002). The press release appeared verbatim in the industry magazine of professional tomato growers *The Tomato Magazine* (2002). It also appeared on the internet newsletter *Prepared Foods.com* (2002) from where it was picked up by the GM advocacy internet news service *AgBioView*, which tellingly left off the final note of the release which records that the survey was funded by the CBI. The electronic newsletter *Plant Breeding News* (2002), which is sponsored by the Food and Agriculture Organisation and Cornell University, included the *AgBioView* version of the story. Reuters ran the story on 11 November 2002 with the headline: "Cancer-Fighting Tomatoes gets US Consumer Vote" (Reuters, 2002), and this version was picked up by, among others, *The Boston Herald* (2002) and Monsanto's electronic newsletter *The Biotech Advantage* (2002).[47]

[47] Monsanto's version left out one of the Reuter's paragraphs: "Current advancements in biotech foods represent a shift from the first wave of biotech plant developments, which have been aimed at pest and weed management, registered dietician Mary Lee Chin said in a statement issued by the council." This erasure is illustrative of a wider split in the CBI over its key messages as each company has a different mix of products in different stages of development. Monsanto, with a large majority of the market share in the "first wave" of products is less keen to see this rhetorically constructed as being superseded.

CBI in the USA and ABC in the UK are bodies designed and largely run by public relations agencies on behalf of the agbiotech industry. These bodies have reframed relations between agbiotech companies and their publics by introducing public relations techniques. This mode of framing constructs representations of 'public opinion' through qualitative and quantitative social research, which is then used in communications strategies. In contrast to the consumer-citizen discussed in Chapter 4, the figure of public opinion with respect to GM technology does not stem from a relationship with a particular company, but rather with bodies designed to represent the industry as a whole. The figure of public opinion is constructed in the context of already existing public spheres, which are located at national scales, concerned as they are with existing news media organisations and government policies. The opportunity for public relations agencies to work in the area of GM debates arose from a sense among the agbiotech companies that they lacked the skills and experience to understand and respond to public opinion.

The sophistication with which the public relations bodies, CBI and ABC frame public opinion does not remove all the tensions from controversy over GM technology. The inability of the public relations mode of framing to unambiguously define public opinion with respect GM technology leads to overflows of meaning and new opportunities for conflicts. For example, a US-based professor of journalism, whose analysis of public opinion research the agbiotech industry often turns to, has become increasingly critical of the way that the industry has represented public opinions. Priest argues that the agbiotech industry has created the impression that the US public is homogeneously pro-biotechnology, ignoring what she claims to be about 30 per cent who have serious reservations about the use of biotechnology in agriculture (Priest, 2002). This minority is made up of a cross-section of the population, rather than a particular "demographic fringe".

In the context of CBI's promotion of news stories about public acceptance of GM foods, the minority of the US population sceptical about the technology is caught in what Priest calls a "spiral of silence". Priest argues that the industry has confused 'opinion expression' with 'opinion formation'. When an event occurs that gives space to the public expression of doubt about GM foods, such as the StarLink maize contamination in 2001, those people who have been sceptical express their views.

According to Priest, what appears to some people in industry as volatile public opinion being shaped by short term media coverage is actually part of longer term structures that relate public attitudes, opinion and the public sphere. Similarly, in the UK, academics have argued that characterising public opinion as being 'anti-GM' is an oversimplification of the ambiguities at the heart of the conditional attitudes which people adopt towards new technologies such as GM (Grove-White *et al.*, 1997).

This section has focused on public relations constructions of public opinion. It has also noted the difference between the communications strategies in the US and the UK. In the US there is a much stronger commitment to 'public education' and the rhetorical use of science to add credibility to the information provided by CBI. However, at the level of designing and testing key messages for their communications strategies, both CBI and ABC use a register of public emotions that is quite different from either the deliberative mode of dialogue or the attestive mode of corporate transparency. The use of focus groups to test messages and the wording of advertisements structures the public discourses adopted by CBI and ABC.

6.5 Emotional engagement

Wynne has written that recent governmental responses to the crisis in legitimacy of current science-based risk assessment have included greater space for ethical concerns and the political rights of citizens (Wynne, 2001; 2002). However, Wynne points out that divisions between fact and value are re-inscribed through these processes, separating the cognitive assessment of facts from the political or ethical weighing of values. In examining the case of EU and UK documents which seek to identify the ethical arguments underpinning public concerns about GM foods, Wynne finds that the documents construct matters of facts as trumping ethical values (Wynne, 2001). According to Wynne, these official documents tacitly assume a model of public action that results from the summation of individual decision-making, which can be fully expressed in the marketplace once sufficient information is supplied. Public mistrust in the regulation of technology is assumed to be an emotional response lacking cognitive substance, rather than what Wynne calls "intellectually-founded moral outrage" (2001: 72).

Techniques of public relations test public opinion using survey and focus group research. What emerges from this research are metrics of the samples' response to particular stimulus, which is then interpreted by the public relations agencies in terms of the public's emotional commitment to particular claims. Both CBI and ABC seek to use this emotional dimension to elicit the desired responses to their campaigns. However, the differences between the context in which the public relations campaigns are playing out is highlighted by the different focus of the campaigns' affective strategies. In the UK the emphasis is on establishing the agbiotech industry as a trustworthy voice in debates about GM foods; whereas, in the USA, CBI communicates directly to public opinion through advertisements that emphasise the ability of GM technology to alleviate suffering.

The Webber Shandwick account director I interviewed stressed that their approach to the GM public relations campaign was informed both by the research that they carried out into public attitudes and what she called their 'intuitive model'. This model conceptualises public opinion as an emotional response to information in the public sphere. According to this model, the public's orientation towards particular pieces of information, packaged as messages, depends in part upon how much the messenger is trusted. The account director justifies their campaign on the basis that, in the UK, publics no longer trust scientists:

> We felt very strongly that time and time again the industry and various groups working in agbiotech had fallen back on scientific argument. Now, while scientific argument has a valid role to play it isn't necessarily the solution. Partly because people no longer trust scientists, and they are used to 'science is not black and white any more, there's a heck of a lot of grey.' Particularly when you are talking about agricultural issues, foot and mouth and BSE, then certainly in this country it's no longer enough to say 'its fine because it's science, we know what we are doing.'
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

Webber Shandwick's starting point is that it is no longer good enough for industry to 'fall back' on scientific arguments. This opens up a space where public relations expertise can reframe the agbiotech industry's relations with a wider public. By shifting the focus of the industry's attention from scientific argument to connecting with public emotion:

> We wanted to try and get to people on the emotional level as well and it wasn't enough just purely to respond to their concerns, very real concerns and genuine fear about the kind of technology. It wasn't enough just to say, you know, men in white coats enter and your problem is solved. It has to be much more emotional, people have to *believe* the arguments that you put forward, and that's very much what - that's really the basis to everything we've done.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

According to the Webber Shandwick account director there are two elements that need to be corrected in order to connect with people on an emotional level. One is to develop a message with which people can identify. The second is that industry must do more to present itself as a trustworthy source of information. The language which she uses is that of interpersonal relations – the agbiotech industry as whole is anthropomorphised, and the instrumental focus of public relations techniques is the 'face' of industry:

> We wanted the industry to have a much more understanding face, which I don't think it has had to date. One that registers people's concerns, and accepts them and is not wholly dismissive and is prepared to listen.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

In this view, in order to change its public face the industry needed to reassess the basis of public concerns. This view was put forward by the account director in the context of the survey and focus group research undertaken by Webber Shandwick during 2001. The objective of transforming the industry's image and listening to public concerns is more effective communication. It is an obvious but important point that the solutions offered by a public relations agency require the skills in public communication which the public relations industry has accumulated over the past eighty years:

> The industry now needs to eat a bit of humble pie, come clean and say we haven't done everything right, we certainly haven't been right about the way that we've communicated a lot of these arguments. We need to do better, we need to listen harder, we need to realise what people's concerns really are and try, where we can, to put forward a positive message about GM that people will not just *accept*, but people will really identify with and – I'm trying to think of a better word than accept – *take to heart* – using not just the left side of the brain but the right side as well. It's got to be an emotional course that actually persuades them.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

One of the roles of the public relations agency is to translate public opinions for decision-makers in the agbiotech corporations. This role of interpretive intermediary, which the ABC campaign assigns to Webber Shandwick, means that the agency is inserted between categories of the industry and the public, both of which are in turn constructed through the work of the agency.[48] The public relations campaign frames public controversy over GM as a contest between two sides fighting over the hearts (rather than minds) of a passive public:

> It's letting industry know how it's perceived and therefore being aware of the care it needs to take when it discusses these issues, and really just sort of flattening out that high-handed approach. 'We haven't always been right and yes there is another side to it'... At the moment the arguments that really make people feel or react emotionally tend to come from the other side.
>
> (Account Director, Webber Shandwick, interview, 12 June 2002)

Turning to the CBI's campaign in the USA and Canada we can find clear illustration of the use of public relations techniques which seek to engage with public emotion. The CBI's three core messages about the benefits of GM foods rely on a shared understanding of problems to which biotechnology offers solutions. The campaign appeals to both the sympathy and sense of global responsibility of US public opinion in arguing for the advantages of using GM to help provide more food, better food, while causing less environmental damage:

> One of the roles of CBI is to learn what research people have to tell us about which messages people will relate to. What we have learned is that people identify with the fact that there are 6 billion, and in 12 or 13 years there will be another billion people, and in a further 12 or 13 years there will be another billion. So there is a real challenge – how are we going to feed this population? And we must not forget that even today there are 800 million people chronically malnourished. The research shows that people really care about this.
>
> (Thrane, interview, 22 February 2001)

The CBI was launched on 3 April 2000 with television advertisements that were targeted at opinion leaders across the USA. According to CBI's model of public opinion, when confronted with novel issues communities tend to turn to already

[48] See Callon (2002) on the way that service industries script roles for their clients. This does not mean that the clients themselves are not agents in the process.

established 'opinion leaders'. These figures, who are in positions of authority, tend also to be more receptive to information campaigns:

> Our target group is "opinion leaders". Not just people in the Washington Beltway, but folks in communities, people who read magazines, leaders of their church, chamber of commerce, community organizations. These people like to be informed – so we develop information for this group.
>
> (Thrane, interview, 22 February 2001)

The first television advertisement, "Promise 1", was designed to reach such opinion leaders through the 'media buy':

> It aired during news shows, the Sunday morning policy shows. And a few primetime shows like Frasier – and programs like that - also the Olympics. It ran since the Council started on April 3.
>
> (Thrane, interview, 22 February 2001)

The television advertisement constructed the problem of world hunger, so that GM foods can be presented as a means of alleviating suffering. And it sought to establish continuity between medical and agricultural biotechnology through the suffering of the patient and the farmer. However, the campaign did not assume that opinion leaders form attitudes based solely on emotional responses, but also require more detailed information.

This sixty second advertisement "Promise 1" opened with stirring music and views of the sun rising over what appears to be a Midwestern family farm. Images of hard working farmers and productive fields then give way to a woman on a beach and then a boy running in a cross country race, before returning to scenes of a cotton harvest. The voice-over makes the connection for us (see Figure 6.7).

[Announcer:]
A soybean crop yields a more bountiful harvest...
A patient has a medicine she needs...
A boy can survive a childhood disease...
A cotton crop helps protect itself from certain pests...

Because discoveries in biotechnology, from medicine to agriculture...
Are helping doctors and farmers...
To treat our sick, and protect our crops.

An American farmer will produce a healthier grain...
And an African farmer can provide better for his family...
Because biotechnology researchers test and test, to find new solutions.
Solutions that are improving lives today...
Solutions that could improve our world tomorrow.

To learn more about biotechnology and agriculture visit our Web site or call our 800 number.

Figure 6.7 CBI's "Promise 1" television advertisement (60 seconds)

After the images of US agriculture, the advertisement then switches scenes to a life sciences laboratory. Images of computer models of proteins and lab benches are intercut with views of agricultural harvest and a US homestead as the voice-over explains the links between agriculture, medicine and science (see Figure 6.7).

Returning to the farm we see the farmer, home from the fields, relaxing with his family. Now, off to Africa, we see a proud farmer walking across a lush field. Back in the US, we see scientists labouring in a pristine laboratory. The four visual images, the life science laboratory, healed patients and productive farms in the USA and Africa make up the story of the 'promise' advertisement. The link between science and its applications in medicine and in farming, both in the US and in Africa is reinforced as the music reaches a climax at the end of 60 seconds and we are directed to the CBI's website, and toll-free telephone number.

There are five groups of characters in this television advertisement. There are the 'biotechnology researchers' who are testing and making discoveries in their laboratory. These discoveries are applied by agents, in this case doctors; farmers who

can 'provide better for his family'; and even the crop, which can 'protect itself from certain pests'. The third group are then the beneficiaries of the applied science, in this case the woman and children who have been treated for illness or are enjoying the farmers' bounty. The fourth group is the advertisement's author, revealed in the final frame as the CBI. At this moment, the fifth group is directly addressed, we, the television audience, are invited to visit CBI's website and telephone to find out more about biotechnology.

The "Promise 1" advertisement performs a linear model of innovation. By the term performance, I mean that it both represents linear innovation and reproduces it through acting out the linear relationship between author and audience. The representation of linearity is clear: scientific discovery passes through technological development and is then diffused into society. The narrative's movement begins with 'discoveries in biotechnology', the applications of which are traced through medicine and fertile fields to appreciative recipients of drugs and food. The advertisement performs this linearity by casting the audience in the role of spectator of the fabulous achievements of biotechnology. The audience are spectators rather than witnesses. That is, until the very end when the audience is invited to interact with the author, the CBI.

In 2002 CBI placed one-page advertisements in the *New York Times* and *Time Magazine* (Council for Biotechnology Information, 2002a; 2002b). These CBI 'advertorials' contain more words than pictures and represent the core public messages adopted by the CBI during 2001: modern biotechnology increases agricultural productivity to feed a growing world population; it can provide more nutritious foods to promote health; and it can help protect the environment by limiting the increase of land required for arable farming.

The protagonists in the US technological public sphere are also cast in CBI's *New York Times* advertorial "Plant Biotechnology: Solutions in a Seed". The text relates three characters: the experts, the technology, and the technology's beneficiaries. The experts appear throughout the piece to define the problems to which biotechnology offers a solution. Experts include named scientists who are quoted in the text and groups of scientists such as "some biologists". Expertise is also embodied by

multilateral organisations such as the Consultative Group on International Agricultural Research; the World Health Organisation; and the United Nations. The UN is used as a source of data on population growth. A graph credited to the UN shows projections of the global population:

> With the world population projected to top 8 billion people by 2030, there will be another 2 billion mouths to feed – most of them in developing regions.
> (Council for Biotechnology Information, 2002a)

Throughout the advertisement the problems are either constructed as global or particularly affecting the global South. The scientists quoted are located in the South and speak for the people of the region they come from. Thus Florence Wambugu, an agricultural biotechnology researcher working in Kenya, defines the problem of lack of food in Africa. The advertisement quotes directly from Wambugu's book *Modifying Africa: how Biotechnology Can Help the Poor and Hungry, A Case Study from Kenya*:

> "Agri-biotechnology matters to Kenya, as to most other African countries, for the most basic of reasons: Our people do not have enough to eat."
> (Council for Biotechnology Information, 2002a)

The advertisement marshals expertise which draws attention not only to a projected global food shortage but also to poor nutrition. Again, this problem is presented at a global scale:

> Up to half a million children worldwide go blind each year due to vitamin A deficiency, according to the World Health Organization.
> (Council for Biotechnology Information, 2002a)

Likewise, the environmental argument is presented as one that requires a consideration of global resources and responsibilities:

> Environmentalists fear that up to half of the world's remaining 6 billion acres of tropical forests will be lost to agricultural expansion.
> (Council for Biotechnology Information, 2002a)

At each point during the advertisement the problems constructed by expertise are addressed by biotechnological innovation:

> *Hunger in Africa:*
> [R]esearchers, led by Wambugu, are continuing the development of a biotech sweet potato that is resistant to feathery mottle virus, a pest which consumes (along with several related virus strains) an estimated three-fourths of the annual harvest.
>
> *Child blindness:*
> Researchers are also working to build a gene into rice that produces more beta carotene, a precursor to vitamin A.
>
> *Increasing productivity on marginal land:*
> In California, researchers have developed a genetically enhanced tomato that can thrive in salty soils – a problem in arid regions where irrigation is used. The hope is to make other plants salt-tolerant as well.

Figure 6.8 Problems to be solved by biotechnology
(Council for Biotechnology Information, 2002a)

Throughout the advertisement beneficiaries are silent. They are constructed through the interplay of the expert vision of global problems and biotechnology's solutions. The lives and interests of the hungry people of Africa, the children at risk of going blind, and the "20 per cent of all tropical forest species" which could be extinct within 30 years, are implied through the description of the biotechnology products being designed to address their needs.

The interplay of the three characters of the expert, the biotechnology, and the vulnerable populations waiting to benefit from biotechnology leaves three sets of actors off stage. The CBI itself; the companies it represents; and the readers of the advertisement, who are part of the public that the CBI is designed to address. Clues to the roles of two of these actors do appear in the text itself. The article's authorship is implied by the CBI's logo in the bottom left-hand corner, which appears together with the web address and telephone number. And the audience for the advertisement is addressed directly in two ways, both of which connect with the public relations goals of the CBI. The first sentence of the text includes the statement that: "global plantings of biotech crops increased nearly 20 percent last year". Thus the advertisement is

addressing readers of the *New York Times* who may not have been aware of the prevalence of GM crops. This message is part of the CBI's plan to inoculate US public opinion by increasing the awareness amongst the US population of the commercialisation of GM crops. By doing so it hopes to guard against the possibility that if GM becomes an issue on a scale equivalent to debates in Europe, people will not feel that they have had GM foods introduced behind their backs.[49]

The second appeal made to the US audience of this advertisement is for a concern for global food provision and environmental well-being, as well as a charitable interest in the poor diets of people in the global South. This message was honed by CBI's research which showed that US opinion leaders responded more favourably to these messages than to stories of the economic benefits to US farmers, or to a rather vague connection between agricultural biotechnology and medical research. The final section begins:

> Research on plant biotechnology is underway throughout the world by scientists working from government, universities, public institutions, and private companies. Yes, there are issues to resolve, some of them difficult. But that work must continue because it can benefit people everywhere, no matter where they live.
> (Council for Biotechnology Information, 2002a)

In this section, the reflections of the Webber Shandwick account director in the UK, and CBI's television and print advertising in the USA all illustrate the public relations mode of framing relations between the agbiotech industry and its publics. In particular, these illustrations emphasise the affective register which this framing invokes. Both the practices of shaping public relations strategies and the rhetorical tropes they employ rely on establishing an emotional connection with the audience for the activities of ABC and CBI. Wynne's argument of the enduring division between scientific fact and public values is supported by these examples from public relations. In the case of the Webber Shandwick account director, scientific justification was explicitly contrasted to the more useful emotional connection. The "Promise 1" television advertisement used images of recovery from suffering in conjunction with images of laboratory science to bolster public confidence in the benefits and safety of GM foods. In the case of the *New York Times* advertorial the interrelation of emotive

[49] There is also the possible benefit of showing that GM crops are a commercial success.

and scientific argument is apparent in the use of expertise to construct the causes of suffering that biotechnology can alleviate.

6.6 Conclusions

This chapter has shown how agbiotech corporations have enrolled public relations agencies and their techniques in reframing relations with a newly powerful public. The principal means by which the companies have done this is by setting up new organisations operated by public relations agencies to represent the industry as a whole. In doing so the corporations have become entangled in practices that have produced tensions with their performance as dialogical and transparent companies. In this concluding section I discuss how this turn to a public relations mode of framing performs the category of consumer-citizenship and that of the corporate innovator of biotechnology. I then begin to explore the implications of differences between the dialogue, transparency and public relations modes of framing for the governance of biotechnology.

The public relations mode of framing is based on the assumption that public controversy in Europe was caused by well-orchestrated campaigns run by environmental NGOs, which exploited a sensationalist media. In this mode 'public opinion' is considered to be important in explaining the ways that European governments, food producers and retailers have responded to the commercialisation of GM crops. Public opinion is therefore of great strategic importance to those companies with a stake in the commercialisation of GM technology. The category of public opinion has become increasingly implicated in corporate innovation strategies.

In the public relations mode of framing consumer-citizens are cast as the holders of 'public opinions'. These opinions are assumed to be formed by emotional responses to information that is put into public circulation through the media. As discussed in Chapter 2, the use of public emotions in debates about technology has been studied by Brown and Michael in the context of controversy surrounding xenotransplantation (2002). They have argued that institutions have coped with crises of legitimation by

developing a new register of affective justifications for public confidence in technological innovation.

In the case of CBI and ABC, suffering and its potential alleviation is central to their justification of agbiotech. This affective discourse opens up a potential avenue for critics of the corporations' development of agbiotech. The public relations strategies of CBI and ABC configure an emotionally-literate audience for information on the safety and benefits of corporate innovation. Although the narrow construction of these subjectivities does not in itself afford them much agency or cognitive capacity to engage in meaningful exchange with CBI or ABC, the very fact of the introduction of this new form of relation with corporate innovation multiplies the possibilities for public debates around GM foods.

In sharp contrast to the frames of dialogue and transparency, individual corporations are absent from the public relations mode of framing. In their place nationally focused public relations bodies have been established in North America and Europe. For example, the stated aim of the Agricultural Biotechnology Council in the UK is to be "a single transparent and accountable voice for all crop biotechnology companies in the UK".[50] The operation of the public relations frame relies heavily on journalists and other 'third party organisations' such as academic societies, to voice the messages which they want to circulate in the media. This mode of framing therefore intensifies the technological public sphere through use of techniques of public relations, in the process opening up a new forum in which technological innovation is centre-stage.

The new public relations bodies, and certainly the public relations firms that run them, avoid becoming the centre of public attention. They aim to be 'transparent' in the sense of being 'invisible'. This clearly contradicts the performance of the corporation as coherent, transparent, open and responsive in the dialogue and transparency modes of framing. From the companies' point of view there may be a tactical advantage in adopting different, not necessarily compatible, responses to the public controversy over GM foods, however, it raises the possibility that competing corporate performances may undermine each other.

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[50] This statement appears as part of the foreword to the brochure produced by ABC on its launch (Agricultural Biotechnology Council, 2002).

The most significant differences between the three modes of framing is the way in which they perform the consumer-citizens and agbiotech corporations. All three modes of framing suggest ways that consumer-citizens can act as agents in the democratisation of technology, although in slightly different ways. In the dialogue mode of framing they are cast as participants; in the transparency mode they are as witnesses in a process of holding the corporation to account; and in the public relations mode they act as holders of public opinions about biotechnology in national public spheres. There are also important differences in the performance of the agbiotech companies. In the dialogue and transparency modes the corporations are centre-stage as socially responsible innovators of biotechnology. In the public relations mode they remain off-stage. The action in this framing revolves instead around the technology itself. In the following chapter the thesis concludes with a consideration of the implications of these differences for the governance of biotechnology innovation.

Chapter 7

Conclusions: political innovation and the governance of biotechnology

7.1 Introduction

This thesis has argued that corporations are important sites at which public controversy over biotechnology innovation is framed. The strategies, narratives and techniques of corporate modes of framing stage performances of the 'socially responsible corporation', the 'agbiotech industry' and the 'consumer-citizen'. This staging constructs new spaces of political negotiation and contest among these actors. Thus, the ways that corporations have employed discursive and material strategies to frame their engagement with 'public controversy' reconfigures the governance of biotechnology.

In this concluding chapter, I place the cases of corporate engagements with controversy over GM foods in the context of debates about contemporary political orders and forms of governance. As I discussed in Chapter 2, Jasanoff has argued that the crisis in legitimacy experienced by multinational corporations over their innovation of GM foods can be understood an element of a wider constitutional upheaval (Jasanoff, 2003a). Increasingly complex entanglements of science, technology and society are asserting themselves as problematic to established political orders across all domains of life. These emerge sometimes as technological and ecological risks, for example in the case of global climate change; as problems confronting the management of disease and public health, as in the case of HIV/Aids and the distribution of anti-viral drugs in the global South; and as threats to peace from technological warfare in all its varied guises. Entanglements of science, technology and society also emerge as opportunities, for example advances in human genetics that promise genetically personalised medicines. Controversies over the risks

and benefits of GM foods are thus just one example of the issues facing contemporary societies which vex established processes for arriving at accommodations between social, natural and political orders.

Common to all these cases of technological controversy is the challenge that they pose to modernist divisions between social and natural; between state and market; between public and private; and between nation states. These entanglements can be understood as engaged in the re-writing of a constitutional settlement as they produce new subjects of constitutional rights, new objects of scientific knowledge and political action, and new spaces of contestation and negotiation. In this chapter I return to the title of the thesis to explore the ways that corporate responses to controversy over GM foods can be understood as 'political innovation'. This term can be read as referring both to the emergence of innovation as a political topic, and to the innovation of novel forms of political engagements with new political actors and spaces. This final chapter examines the interplay between these two meanings of political innovation through the cases studied in the preceding chapters.

In this thesis I have explained how corporations have understood and engaged in controversy over GM foods. I have used texts produced by the six agbiotech companies and Unilever to illustrate the ways that they have sought to reframe their relations with a newly vocal public. I have argued that the companies have enrolled external expertise as they materially and discursively reframe 'the public' in different ways. In doing so, the companies have contributed to reconfiguring patterns of biotechnology governance. These corporate modes of framing public engagements with biotechnology innovation employ terms and practices from democratic political traditions. The companies have invoked concepts of citizenship rights to participate in decision-making, and institutional transparency as a means of achieving accountability. Through the public relations mode of framing a raft of techniques and expertise contributes to the production of a public sphere in which biotechnology is the object of public opinion. In this final chapter I reflect on the ways that these modes of framing and their interactions with each other perform the governance of biotechnology innovation.

This chapter now turns, in section 7.2, to summarising the arguments of this thesis. Then section 7.3 considers in more detail the implications of focusing on performances of 'the corporation' for understandings of the global controversy over GM foods. This section also comments on the ways that this thesis contributes to understandings of corporations in geography and science and technology studies. Section 7.4 explores the geographies of the modes of dialogue, transparency and public relations. It does this by examining how boundaries between 'public' and 'private' are performed in each of these modes of framing. The boundaries that are produced are important in defining the identity of the corporation and its relationships with others. The section then discusses how hybrid spaces for negotiating this public-private boundary are created through the expertise, techniques and narratives that make up the modes of framing. Section 7.5 then addresses the political implications of these three corporate framings. It pays particular attention to the configuration of 'consumer-citizenship' as this category emerges from managerial responses of the companies studied in Chapters 4, 5 and 6. This section also explores the ways that corporate innovation is performed in each of the modes of framing. The section argues that the political opportunities that the new articulations of consumers' citizenship rights create, and the spaces in which these are claimed and addressed, are moments in a wider constitutional wrangle over the governance of science, technology and society. Finally, this chapter concludes the argument of this thesis by summarising its contribution to debates in geography and science and technology studies.

7.2 Summary of main arguments of the thesis so far

The global controversy over GM foods provides the context for this study of the self-performance of corporations in relation to consumer-citizens. In Chapter 1 I described processes that led to the construction of a global controversy over GM foods. Molecular biologists, monarch butterfly larvae, NGOs, journalists, GM potatoes, governments, social scientists, consumers, food retailers, protestors, and agbiotech companies all contributed to the production of public controversy, and its global scale. I argued that some people in the agbiotech corporations have interpreted this public controversy as a crisis in the companies' biotechnology innovation practices. In

response, the companies have begun to develop new ways of incorporating 'the public' into their models of technology innovation and marketing.

In Chapter 2, I developed a theoretical approach to studying corporate engagements in this global public controversy. I began by placing this crisis and the institutional responses it has provoked in the context of a tacit re-writing of constitutional arrangements between science and society. I then went on to discuss the ways that the category of 'citizenship' has been studied, and I argued that a focus on the emergence of citizenship discourses and practices is a useful way to chart the contours of the contemporary constitutional moment. I then explored the way that corporations have been studied as social actors. I argued for approaches which understand them as relational achievements of material and discursive practices. Finally, I developed a performative approach to studying the co-production of new forms of 'consumer-citizenship' with institutional arrangements of the 'socially responsible corporation'. To do this I discussed the ways that organisational 'modes of framing' stage specific performances of corporate engagements with controversy over GM foods.

In Chapter 3, I explored the methodological implications of studying corporate performances of their relations with citizen-consumers. My position as a participant observer in the construction of public identities of corporate actors was addressed in this chapter with reference to methodological discussions in cultural geography. I then described the qualitative approach that I used to collect and produce a variety of texts through which corporate performances of themselves could be traced. The overarching methodology I developed in this chapter was an ethnographic approach to interpreting these texts as staging performances of the corporations. In this chapter I listed the sites at which I encountered these corporate performances. I also discussed my use of the concept of 'modes of framing', which is understood as both being performed by the corporations and staging performances of the corporation.

In Chapter 4, I explored how DuPont, Monsanto and Unilever used the concept of public dialogue in discursive performances of themselves as new, more 'socially responsible' corporations. Both DuPont and Monsanto set up advisory groups of global experts in a range of areas including public health, nutrition, business, politics, bioethics, the environment, and international development. These groups attempt to

frame global public concerns using the expertise of the companies' advisors at six-monthly meetings facilitated by a US NGO specialising in conflict resolution. Unilever did not engage in such high profile global dialogue, but through meetings with NGOs in the UK the company developed relationships which led to its sponsoring of social science research on public attitudes to GM foods. This research was used by some people within Unilever to develop framings of the public as 'consumer-citizens'. This framing led them to rethink consumer demands that companies like Unilever take account of broader questions of social and environmental justice in their product development strategies. The concept of 'consumer-citizenship' has since fed into Unilever's development of its programme of corporate social responsibility.

In Chapter 5, I traced how DuPont and Monsanto have also produced a mode of corporate transparency to frame their relations with concerned publics. This mode of framing borrows from liberal democratic discourses of accountability. This chapter illustrates that transparency is not an objective state that institutions can attain, but is rather a process that requires the careful choreography of representations, props, backdrops and audiences. The uses of transparency in democratic modes of accountability imply that the audience is constituted by knowledgeable witnesses who have the capacity to judge the actions of their corporate agents. In the case of both DuPont and Monsanto, the public audiences for corporate transparency are framed as hybrid consumer-citizens. In order for transparency to achieve greater corporate accountability, its audiences must be able to engage with the objects made visible, in this case the science of GM technology. In this sense the public are framed as knowledgeable citizens. However, in the ways that science and the corporations are presented on the websites of DuPont and Monsanto, there is limited opportunity for public audiences to engage critically with what is on show. It is in this sense that the public is framed as consumers of corporate information programmes. I therefore argue that corporate transparency is another site at which the category of consumer-citizenship is performed.

In Chapter 6, I explored the role played by the public relations bodies founded by the six agbiotech companies in North America and Europe. In contrast with the framing of public dialogue and corporate transparency, the geographies of the public relations

initiatives are more explicitly connected with nation-states. The first two modes of framing are produced through local enactments of global corporations, for example a company website, or the speech of a CEO, whereas the public relations frame, mediated by global public relations firms, is designed around the operation of what are broadly nationally-defined media industries. In the public relations mode, the public are framed as the bearers of 'opinions' which are formed by interactions with information provided by the media. Again, I argue that the tacit model of 'the public' framed by this mode of corporate response to the GM controversy is a manifestation of the consumer-citizen. The public relations campaigns invoke the ideological function of the public sphere as a site in which legitimacy is conferred through public debate. At the same time, the performance of the agbiotech industry collective emphasises the importance of government regulation and scientific expertise, thus reducing the significance of the specific company. In this way the mode of framing contradicts that of corporate transparency and dialogue, which both focus on individual companies. It seeks to preserve the distinction between public authority of governments and scientific institutions on the one hand and commercial relationships between companies and their consumers on the other. However, it tries to establish this distinction by straddling the very boundaries that it is trying to re-produce. In the following section I draw out the geographies of these modes of framing by exploring the boundaries they create around corporate innovation, and the new political spaces they produce.

7.3 Global GM controversy and corporations

This PhD thesis makes a substantive contribution to the study of the global GM controversy at the turn of the century. It does so by focusing attention on those corporations at the centre of the development of GM crops. These companies have been the target of NGO campaigns against the current generation of GM crops, and they are the subject of the regulatory regimes which have been established nationally, by the EU, and globally. The actions of these companies is discussed in academic studies of the controversy and it implications. However, as discussed in Chapter 1,

there has been surprisingly little sustained effort to study how these central actors have themselves understood and responded to controversy over GM crops.[51]

This thesis has treated the self-presentation of corporations in the context of public controversy as an important site at which to trace the contours of a wider constitutional crisis over science and society relations. The cases examined in this thesis demonstrate that companies perform multiple, even contradictory, configurations of themselves. Thus, 'the corporation' is not an inherently stable actor, but its identity is achieved and stabilised through myriad moments in which it is performed. Tracing the production of 'DuPont', 'Monsanto', 'Unilever', and the 'agbiotech industry' through moments of corporate engagement with public controversy opens up possibilities for re-theorising the politics of corporate innovation. The argument presented in this thesis is intended as a contribution to the process of opening up corporate innovation to further public debate by analysing the ways that this is already happening. This approach has important theoretical implications for studies of the role of corporations in the governance of technology. In the following section I explore these consequences for debates in geography and science and technology studies.

The account of corporate engagements with public controversy given by this thesis contributes to studies of the sociology of technology. The argument of this thesis adds a new perspective to the concept that controversy over new technologies is resolved by the reshaping of the technological artefact (Bijker, 1995; Martin, 1998). Bijker gives the example of the modern bicycle as an example of how the critics of a technology are enrolled by changing the artefact's design. The Penny-farthing with its large front wheel was fast and dangerous, its design excluded many people from riding it and its speed made it unpopular with other visitors to the parks in which it was ridden. In the last decade of the nineteenth century, the 'safety bicycle' was invented with equal-sized wheels, which led to a dramatic increase in the use of bicycles. Thus, controversy was settled and the technology stabilised through innovating new forms of the technical artefact. This approach to the sociology of technology focuses attention on the material production of new artefacts. The cases

[51] Chapter 3 suggests that one of the reasons for this dearth of interpretive scholarship on the agbiotech corporations is the practical difficulty of gaining access to them for research.

examined in this thesis demonstrate that the agbiotech companies have not tried to reconfigure GM crops as material objects, rather they have innovated new institutional forms that support the technical artefact. If GM crops are viewed as an element in a wider sociotechnical ensemble, then in this case the innovation has occurred at the more 'socio' end of the sociotechnical continuum.

Recent studies of technological controversies have discussed ways of understanding public controversy as a form of technological assessment (Bauer, 1995; Rip *et* al., 1995; Grove-White *et al.*, 2000). Some studies have also explored the ways that government regulation is shaped by, and in turn frames, public controversy (Jasanoff, 1995; Bauer and Gaskell, 2000; Marris *et al.*, 2001). This thesis contributes to understandings of the mechanisms by which public controversy articulates with institutions involved in the governance of biotechnology. It does this by focusing on the corporation as a site at which knowledge about public controversy is produced and acted upon. The methodological approach I have followed attends to the performance of corporations as reflexive organisations, newly attuned to the role of 'the public' as an actor in corporate technology policy.

As an example of how the corporations are performed as reflexive, both the dialogue and public relations mode of framing involve sophisticated techniques for representing publics as consumer-citizens. The elaborate construction and representation of the advisory groups for example indicates the material and discursive work required by the dialogue mode of framing. Both the transparency and public relations mode have developed ways of producing public knowledge about the corporations and biotechnology. The choreography of corporate objects, visual representations and the audiences required to achieve corporate transparency itself requires the re-ordering of the boundaries of the corporation. Thus, the different modes of framing articulate different relations between corporate innovations and its publics. It is this relationship that is often left unexamined in studies of the way that public controversy shapes the governance of technological innovation.

This thesis argues that a productive approach to understanding corporations as sites at which public controversy is framed is provided by Callon's (1998) study of the construction of markets. The companies studied are not simply reacting to public

attitudes, controversy and regulatory mechanisms. They are actively developing strategies for interpreting and intervening in public controversy. Examples of this are the ways that the public relations mode of framing measures public opinion using questionnaire surveys and focus groups, and does so in a way that refines a communications strategy designed around the measured responses to specific messages. These interventions engage in constructing the very forms of the public sphere in which public controversy over GM foods takes place.

Chapter 2 introduces discussion of the emergence of consumer oriented regulation of food provisioning in the UK (Marsden *et al.*, 2000). Marsden *et al.* argue that private-interest regulation carried out by large food retailers works in combination with state regulated minimum standards. The examples studied in this thesis demonstrate that similar hybrid systems of private and public interest regulation are being developed around the innovation of new technologies. This arises from the corporations' understanding of controversy over GM foods as marking the end of a linear model of the governance of regulation, as discussed in Chapter 1. In the cases of the dialogue and transparency modes of framing the corporations are performing themselves as legitimate innovators in the public interest. Which is why, in the dialogue frame, it is important for them to develop mechanisms to include consumer-citizens perspectives in their technology decision-making.

This thesis also provides empirical illustration of O'Niell's discussion of complex discursive corporations introduced in Chapter 2 (O'Niell, 2003). The examples of the performance of corporate relations with publics over technological innovation develops O'Niell's approach by combining it with a dramaturgical approach that emphasises the production of corporate identities through interactions with external audiences. This thesis also contributes to Schoenberger's (1997) concept of corporate culture. The modes of framing discussed here show how corporate culture is produced not only by the managers of the corporation, but also by external expertise and techniques. Thus the corporation as an identifiable organisation with a unifying corporate culture is produced in collaboration with agents who are written out of the story of enterprise culture.

The corporations studied in this thesis do not have stable social and material boundaries, rather, the identity of the companies and their relations with consumer-citizens are performed through the three modes of framing. This is illustrated by the example of corporate transparency at DuPont and Monsanto discussed in Chapter 5. Biotechnology innovation is created as a new object of corporate transparency through the practices of displaying information about the research underway at the companies. Previously, the 'internal' processes of corporate innovation had only been communicated beyond the company in terms of patent applications, scientific publications, regulatory submissions, and presentations of the company's research 'pipeline' to the financial community. In other words, the boundaries of 'the corporation' emerge through engagements such as those studied here. The following section explores how the three modes of framing perform the boundaries of the corporation and produce spaces in which the corporate governance of innovation is negotiated and contested.

7.4 Modes of framing the boundaries and spaces of corporate innovation

My approach to studying performances of corporate engagement with public controversy is concerned with corporate geographies. My attention to the modes of framing these performances highlights connections between the specific moments of corporate interaction with their publics, and the global corporate identities these interactions produce. This section first discusses how each of the three modes of ordering performs the boundaries of the corporations and how these boundaries mark 'public' from 'private' spaces of the multinational science-intensive corporation. The section then goes on to explore the construction of hybrid spaces in which consumer-citizens and socially responsible corporations meet. Finally, the section addresses some geographical implications of these modes of framing for theories of the governance of biotechnology innovation.

The identity of agbiotech corporations is produced through the performance of their boundaries. Critical to a concern with the politics of biotechnology innovation is the question of where corporate research and development takes place. To what extent is corporate innovation subject to scrutiny as a matter of public interest? Or, is research

policy private, made 'backstage', the consequences of which only later become matters of public interest through the operation of state regulation and economic choices in the market? These boundaries of corporate innovation are performed differently by each of the modes of framing.

DuPont, Monsanto and Unilever all turned to concepts of 'public dialogue' as a mode of framing relations between the companies and a sceptical public. Each of the companies instituted dialogue by turning to people from NGOs and academia to help represent public concerns at meetings run by external facilitators. An additional element in Unilever's dialogue mode of framing was social science research carried out into public attitudes to GM foods. This work was co-ordinated by Unilever's NGO dialogue group and funded by the company. For all three companies these modes of framing performed three different geographies of corporate innovation.

The first geography of the dialogue mode of framing localises the corporate actor as a trustworthy interlocutor. As Chapter 4 shows, corporate dialogue frames public controversy over GM foods as resulting from a lack of public trust. The speeches given by the chief executives of each of the companies emphasised that the speaker embodied the corporation. Rather than responding to public concerns by saying 'trust us, we are experts' the chief executives were saying 'trust us, we are an open and listening company that takes your concerns seriously'. This performance relies on the construction of the corporation as a coherent and stable actor that can enter into a social contract to innovate biotechnology in the public interest. This geography exists in tension with the second way that dialogue performs corporate boundaries. In order for the companies to generate and concentrate representations of global public concerns they enrol a wide-range of expertise and techniques. These include the academics, NGO representatives and facilitators who make up the expert dialogue groups discussed in Chapter 4. In other words, the boundaries of corporate activity and relationships are extended in an effort to produce performances of the coherent trustworthy actor. This is a geography of extensive networks which recognises that knowledge relevant to biotechnology innovation is widely distributed throughout society. There is also a third geography of corporate dialogue. This arises from the performance of corporate technology policy as a matter for public debate. What had

taken place backstage is performed, in the dialogue frame, front of stage in full view of the companies' consumer-citizens.

The transparency mode of framing performs similar corporate geographies to those of dialogue. Again, the performance of the corporation as a stable and visible object of public knowledge exists in tension with the complex choreography of websites, texts, cameras, and audiences. As discussed in Chapter 5, DuPont and Monsanto both turned to 'transparency' simultaneously with their efforts to initiate public dialogue as a mode of framing. The two companies have tried to achieve transparency through providing information about their scientific research, by informing visitors to their websites about biotechnology more generally, and by opening up the companies to external gaze through increasingly sophisticated corporate websites. These techniques frame the interaction between the corporation and an external public in terms of a relationship of accountability.

The transparency mode of framing, like the dialogue mode of framing, changes the relationship between corporate innovation and consumer-citizens. It performs a shift from corporate research and development as a private matter protected by commercial confidentiality, to corporate technology policy as open to external audit. These tensions are, of course, not new. However, in other areas legal arrangements have grown up to mark the boundaries between what is open and what is closed. The companies are all 'public' in the sense that their shares are publicly traded on global stock markets. Legal and accounting rules exist which stipulate what a company must declare and when it must do so. Similarly, the patent system has grown up to balance the right of private property ownership with the publication of scientific and technological discoveries (Boyle, 1996). Regulatory systems have procedures to protect the 'commercial confidentiality' of some aspects of a company's research and development data, on which regulatory decisions are made. However, such accommodations have not yet been reached in the case of wider public scrutiny of corporations' technology strategies.

The public relations mode of framing performs quite different corporate geographies from those of dialogue and transparency as it does not aim to counter the crisis of legitimacy through increasing public trust in the corporation as a socially responsible

innovator of biotechnology. Rather, public relations techniques perform biotechnology as an object of public opinion in national public spheres. This is illustrated by the television advertisement run in the USA by the agbiotech industry public relations body, the Council for Biotechnology Information (CBI). The advertisement "Promise 1" focuses public attention on biotechnology as a whole, including its medical and agricultural applications. The narrative creates an emotional connection between the viewer and the farmer or patient who stands to benefit from the technology. Although the advertisement presents the technology as global in its scope, including African farmers as its potential beneficiaries, "Promise 1" was tested on a particular segment of the US public and aired during news programmes routinely watched by the 'opinion forming' public the advertisement was designed to reach.

Details of specific products and particular companies were not mentioned in "Promise 1". Constructing an identity for the 'agbiotech industry' was one of the principal strategic goals of CBI's and its UK equivalent the Agricultural Biotechnology Commission (ABC). By subsuming the identity of the six individual agbiotech companies under nationally-defined industry bodies, the public relations mode seeks to produce positive 'public opinions' about agbiotech based on an emotional connection with key messages. This differs from the commitments to ideologies of deliberative and representative democracy that are implicit in the dialogue and transparency modes of framing. However, the public relations mode of framing is similar to those of dialogue and transparency in that it depends on enrolling expertise, practices and discourses from outside the companies. In this case public relations firms are hired by the agbiotech companies to take much of the responsibility for devising and executing the industry's public relations effort. Also necessary for this mode of framing are journalists and the institutions of the media. It is through these means that CBI and ABC are established as representing the agbiotech industry.

This discussion of the different performances of corporate geographies can be understood using Hilgartner's development of dramaturgical metaphors of institutional 'region behaviour', as discussed in Chapter 2 (Hilgartner, 2000). The dialectic of revelation and concealment, which produces an institutional backstage differentiated from its front stage public performance, is evident in the operations of the three modes of ordering. What is made visible in the dialogue and transparency

mode is 'the innovating corporation', and what is made visible in the public relations mode is 'agricultural biotechnology'. In the dialogue and transparency modes, the facilitators, consultants, details of specific meetings, and technical arrangements for representing the transparent corporation are made invisible. However, as was argued in Chapter 4, glimpses backstage are performed as part of a process of legitimising the expert dialogue groups to wider publics. By stark contrast the public relations mode makes the individual corporations invisible. This concern with what is made visible and invisible contributes to an understanding of the political actors and objects produced by the agbiotech corporations engagements in public controversy. This section now turns to consider the construction of spaces of negotiation and contest in which these actors and objects meet.

Each of the three modes of framing opens up spaces in which interactions between the corporations and the newly configured consumer-citizen occurs. The concept of framing, related as it is to Goffman's understanding of social interaction in terms of staged performances, is inherently spatial. Like Hilgartner's use of Goffman's dramaturgical metaphors to locate social interaction in a specific spatial context, the concept of framing highlights the spaces that are produced in order for interaction to occur. Each frame produces a different space in which the 'responsible corporation' and the 'consumer-citizen' can interact.

In the case of the dialogue mode of framing two distinct yet inextricably linked spaces are opened up. The first of these spaces is internal to the corporation, which folds in expert representations of public concerns. In this internal space of expert dialogue public concerns are represented by the embodied legitimacy of the NGO and academic representatives. The dialogue mode of framing also performs spaces beyond the localised hybrid forums of expert dialogue. These external spaces are formed in direct relation to the internal processes of expert dialogue, and connect the spaces of expert dialogue with external consumer-citizens through practices of representation.

These experts take on the role as spokespeople for global public concerns, thus producing a large discrepancy between the scale of deliberation, and the scale of public trust which the companies hope the dialogue framing will produce. As Ezrahi (1990) has argued, the operation of democracy requires the mediation of technical and

cultural resources before 'representation' becomes legitimate. At these early stages, such dialogue groups can only make tenuous claims to legitimacy as representatives of wider public concerns.

The expert dialogue groups operate by claiming to represent consumer-citizens, both in the political sense of being able to speak legitimately 'on behalf of' consumer-citizens, and in the scientific sense of speaking 'about' consumer-citizens.[52] The dialogue groups seek both to represent the public as 'consumer-citizen' subjects, and thereby help to establish the companies' public legitimacy. They also seek to represent the public as objects of knowledge, which can be used by the companies to develop less controversial commercialisation strategies.

The dialogue framing of all three companies, but particularly that of DuPont and Monsanto, have produced new spaces through their efforts to publicise the activities of the expert groups. The reports, websites, and press releases produced by DuPont and Monsanto establish a connection between the group and wider consumer-citizens. The impetus for the social science research commissioned by Unilever, which resulted in the *Uncertain World* report (Grove-White *et al.*, 1997), came from a desire of all members of Unilever's NGO dialogue group to have a clearer picture of how the UK public thought about GM foods. The report opened up a hybrid space in which social science research, public debate, and corporate strategy meet. In a sense this space is very limited: the nine focus groups each met only once for two hours; and access to the group was determined by the researchers who led the discussions. However, in a second sense this space is wider. The research findings were discussed widely in public policy, commercial and academic contexts. In addition, the research methodologies, designed to develop broad understandings of public attitudes to new technologies have been taken up within Unilever.

The transparency mode of framing opens up a space in which the corporation and its actions are made visible to consumer-citizens. DuPont and Monsanto have attempted to achieve corporate transparency through displaying representations of the companies and their scientific work on the internet. The spatial relationships between the

[52] Latour has presented an argument for taking a common approach to understanding political and scientific acts of representation (1993: 27-29).

company and their publics are structured by their reliance on the corporate websites as a means of producing transparency. However, locating multinational companies in one place is a challenge. Both Monsanto and DuPont not only have facilities in many different countries, they also comprise different businesses which often operate under different names. For example farmers can buy seeds from AsGrow, DeKalb, or Pioneer Hi-Bred, all of which are owned by either Monsanto or DuPont. The corporate website is one site where the corporation is located. The global extent of the internet opens questions about the identity of the consumer-citizens who perform the role of witnesses to the staging of corporate transparency through the internet.

The public relations mode of framing does not produce any new public spaces. Instead it operates by promoting messages about biotechnology which are designed to produce positive public opinions about GM crops. Whereas both the dialogue and transparency modes of framing created hybrid spaces in which the corporation and consumer-citizens interact, the public relations mode isolates the backstage of public relations from the front stage of national public spheres.

This section argues that the three modes of framing studied here perform corporate geographies. These geographies shape the boundaries of the corporation and produce new spaces in which consumer-citizenship is co-produced with new forms of corporate innovation. The argument I have presented here draws on Whatmore's (2002) approach to studying hybrid geographies. Whatmore has developed insights from science and technology studies such as Latour's (1993) discussion of the co-production of nature and culture that I introduced in Chapter 2. Her interest is in reinvigorating debates in the social sciences about the role of nature-culture hybrids in what have been regarded as 'purely' human affairs. An example of the ways that 'non-human' actors play vital parts in constituting the social world is provided by Whatmore's discussion of the neglected role of the soybean itself in public controversy over GM foods. Her geography of the soybean traces it from China 3,000 years ago, to early twentieth century US breeding programmes, to the intimate sphere of food consumption where the soybean is ingested (Whatmore, 2002: 120-45).

I argue that just as Whatmore's attention to the role of what is termed 'natural' or 'material' sheds light on the hybrid constitution of both the natural object and its

social context, similar attention to 'human' or 'social' subjects also reveals hybrid geographies. In this thesis, my concern has been with the performance of the social categories of the corporation and citizenship. In doing so I have elaborated a hybrid geography that involves material apparatuses, techniques, plants, and butterflies among many other elements. This attention to the hybridity of the geographies performed by the modes of framing highlights the heterogeneous processes of purification. In other words, this thesis shows that the production of spaces of citizen engagement and spaces of corporate responsibility depends on the framing of situations, which inevitably involves overflows. It is the impossibility of stemming these overflows that leads to the significance of the category of consumer-citizenship. In the following section I explore the political implications of the emergence of consumer-citizenship. In particular I pay attention to how this shapes the governance of biotechnology innovation.

7.5 Political innovation

This thesis has argued that corporate responses to controversy over GM foods have been discursively and materially performed by three modes of framing. These framings are political innovations in that they can be understood as interventions in the re-writing of constitutional arrangements between science, technology and society. The corporations' three modes of framing have institutionalised new spaces of political negotiation, such as the expert dialogue groups, and a global attestive public sphere in which corporate transparency is performed. These framings have also configured subjectivities of consumer-citizenship in relation to quasi-sovereign corporations. They have produced corporate biotechnology innovation as a new object of political debate.

The dialogue, transparency and public relations modes of framing each stage a particular performance of the interaction between the corporations and their publics. Each performance uses different techniques and expertise, and employs different narrative devices to press forward the momentum of the performance. This section explores the tension that exists within these modes of framing between performing corporate-public interactions as calculable, and performing them as opening up spaces

of political contestation and negotiation. This section goes on to describe in more detail how these tensions play out in the narratives employed in each of the modes of framing, paying particular attention to the ways that the narratives cast the roles of consumer-citizen and perform the governance of corporate innovation of biotechnology.

Throughout the thesis I have pointed to the ways that the modes of framing open up potential spaces for democratising corporate innovation through the companies' own recourse to discourses and practices of liberal democracy. However, using Barry's vocabulary introduced in Chapter 2, the three corporate modes of framing public controversy can also be understood as extending the anti-political economy inasmuch as they are attempts to contain public controversy. The companies studied in this thesis employ modes of framing that are managerial in their ambitions. They seek to understand public controversy in such a way that they can act to alleviate its negative commercial consequences. The modes of framing focus on the figure of 'the public' and invent techniques to translate 'the public' and its concerns so that the companies can adapt their biotechnology policy to reduce public conflicts and ease the introduction of agbiotech products into global markets.

All three modes of framing configure the category of 'consumer-citizen', although they do this differently. In the case of the dialogue mode, for example, the expert dialogue groups aggregate representations of consumer-citizens as centres of corporate decision-making. The dialogue mode of framing therefore serves to render calculable the public context for corporate biotechnology strategy. To the extent to which the calculations hold, the political disputes are purged from the space of calculation.

As Barry has pointed out, the construction of calculable spaces in which corporations can manage interactions with their publics necessarily entails the production of new relations and objects, which can themselves produce new political possibilities (Barry, 2002). This is evident in the cases explored in this thesis. The three corporate modes of framing, dialogue, transparency and public relations, do not succeed in resolving public controversy over GM foods. Although they may help the corporation to cope with the entrance of the unfamiliar consumer-citizen into their technology strategy-

making, these frames also pose new questions. These modes operate in ways that open up possibilities for intensifying the politicisation of corporate biotechnology innovation. There are four ways in which these modes of framing are political innovations.

First, the frames are not constructed in conditions of the companies' choosing. Rather, they operate in the context of highly charged debates about the global governance of multinational corporations and technological risk. In framing the GM controversy as a crisis of public legitimacy, the modes of framing employ discourses of democratic governance. As such, these responses can be interpreted as part of wider constitutional wrangles in which consumer-citizens and socially responsible corporations also figure. The arguments presented in this thesis are based on empirical encounters with corporate framings of controversy over biotechnology, however they assume that these corporate constructions are part of a recursive process. They are, to borrow Callon's terms, *experiments* which require the participation of consumer-citizens themselves in a joint project of writing a constitution that sets out the rights of consumer-citizens with respect to corporate biotechnology innovation (Callon, 2002). The dissonance that is created by different notions of citizenship operating across various domains of governance opens up space for political contests over the meaning and significance of these corporate framings.

Second, the modes of framing are relatively weak in the face of global controversy over GM foods; what is produced is more like a hybrid forum of negotiation than a zone of calculability. The struggles to establish the three modes of ordering illustrate the difficulty of fixing either the identity of the relevant actors or the implications of particular interactions. The reference to Law's term 'mode of ordering' sensitises this analysis to the provisional quality of the order achieved by the corporate framings, and to the organisational work required to stabilise this provisional order. This is illustrated in Chapter 4 by the lengths that DuPont and Monsanto go to act out their chief executives' commitments to greater corporate dialogue. Not only do the CEOs make speeches, but these are then reproduced and disseminated in press releases, internal memos and exhibition stands, on corporate websites and in glossy brochures. More than this, advisory bodies are established and meet twice a year, bringing experts from around the globe to meet with senior executives. These meetings are

themselves subject to similar processes of representation and dissemination, including in corporate reports that present evidence to sceptical consumer-citizens that the company 'really is listening to their concerns'. This work to establish the dialogue mode of framing presents many moments at which corporate governance is opened up to public scrutiny and potential challenge.

The third way in which the modes of framing are political follows from the previous point. Techniques and external expertise are brought into the company in order to frame the interactions between the company and its consumer-citizens, in doing so they bring with them connections to other actors and concerns that 'overflow' into the newly established frame. Callon (1998) has argued that this inevitability of overflows is a general condition of framing. In order to stabilise the modes of framing corporations have turned to a variety of different techniques and experts. The more allies the corporation recruits in constructing modes of framing, the greater the overflows that are produced. This is illustrated in Chapter 4 by the ways that the NGO and academic participants in Unilever's NGO dialogue group used the research on public attitudes to biotechnology to push Unilever further in its commitments to opening up its internal technology policy to public scrutiny.

Fourth, the modes of framing are productive of new subjects, objects and spaces, which present fresh political opportunities. This point is closely linked to the first three ways that modes of framing are political. For example, in Chapter 6 'biotechnology' is itself produced as an object of public opinion in national public spheres. In Chapter 5, the corporation is performed as transparent and accountable to a global public through the practices of corporate information campaigns. Chapter 4 explores how consumer-citizens are configured as new political actors in corporate innovation. As these modes of framing draw on democratic discourses, the term 'consumer-citizen' is connected with established expectations of what it means to have citizen-like rights. The way that this term is configured by the corporation, and then circulates beyond the initial context of corporate dialogue, produces new citizen rights with respect to corporate technology policy. The following discussion highlights the ways that the configuration of consumer-citizenship differs in each of the three modes of framing.

Different framings of consumer-citizenship

Despite the differences between the dialogue, transparency and public relations mode of framing, there is one important tension that runs through them all. All three modes perform the public as consumer-citizens, albeit in a variety of ways. The consumer-citizen is commercially important to the companies, and at the same time requires the companies to respond to their citizen-like demands to have a voice in the innovation of biotechnology.

In Chapter 4, consumer-citizen rights to participate are evident in the case of the dialogue mode of framing relations between the corporation and the public. The discursive performance of the corporations, particularly as embodied by their CEOs, commit the corporations to take public concerns about biotechnology seriously. These nascent consumer-citizen rights to participate through having their concerns listened to by the companies are, however, only tenuously institutionalised by the expert dialogue groups. Despite this, the existence of these groups opens up a space in which consumer-citizen views are expressed. This is illustrated in the Unilever case. The inclusion of NGOs and social scientists respected by the environmental NGOs extended the corporate imagination of their publics. People at Unilever who were involved with the NGO dialogue began to talk about consumer-citizens with rights to engage in corporate technology policy. In the cases of DuPont and Monsanto there is a tension evident in the scope of consumer-citizenship rights to voice concerns about biotechnology. As discussed in Chapter 4, both companies attempted to maintain a distinction between scientific knowledge and public values. The institutionalisation of dialogue at the two companies often reinforced this distinction by limiting the range of consumer-citizen concerns. However, in all cases consumer-citizens are configured as having a right to participate in corporate technology.

In Chapter 5 the ways that the transparency mode of framing performs corporate accountability is illustrated with reference to the information campaigns of DuPont and Monsanto. In this case it is not representations of consumer-citizens that are concentrated within processes of corporate decision-making, rather representations of the transparent corporation are disseminated in a newly constituted global polity. These global consumer-citizens exist in relation to a sovereign-like corporation.

Similarly to the performance of consumer-citizenship in the dialogue mode, there is a fundamental tension in the way that corporate transparency configures consumer-citizenship. On the one hand the transparent corporations derive legitimacy from opening themselves to the scrutiny of attestive citizen-like witnesses, who are able to engage in substantive debate about the forms of technology being developed. On the other hand, the companies earn public trust by displaying the amount of scientific research they have carried out to the appreciation of consumer-like spectators. This tension, which is unresolved in the cases studied in this thesis, suggests the possible intensification of political contests over corporate innovation. If companies seek public trust to continue their biotechnology policies by employing discourses and practices of democratic accountability, then they are producing the tools that will allow groups who claim to represent public views to demand greater corporate accountability for decisions the companies make about biotechnology.

In Chapter 6, the public relations mode of framing performs a relationship between the agbiotech companies and consumer-citizens that is quite different from that of the dialogue and transparency modes. Individual corporations remain backstage, and instead it is the technology itself that takes centre-stage. Consumer-citizens are configured as publics who hold opinions about biotechnology informed by national media. As was illustrated by the "Promise 1" advertisement, and in my interview with the public relations account director in London, consumer-citizens are performed as relating to biotechnology on an emotional level. This affective register operates through narratives of suffering, which biotechnology then promises to relieve.

To sum up this discussion of consumer-citizenship I argue that there are two important questions posed by the configuration of consumer-citizenship emerging from these three modes of ordering. First, does this form of citizenship operate at a global or national scale? In the case of the dialogue and transparency modes, consumer-citizenship operates at a 'global' scale that is performed through the particular geographies of the quasi-sovereign corporation. In the case of the public relations mode, it operates at a national scale defined by a national news media and state regulatory system.

Second, what are the implications of the tensions between the 'consumer' and 'citizen' dimensions of consumer-citizenship? In the case of the dialogue mode this

tension is reflected in the different moments of corporate research and development at which consumer-citizenship can be expressed. At early stages of innovation more citizen-like expressions about the social and environmental consequences of particular technological trajectories are possible. When making economic decisions once the product is on the market, public expression is restricted more to the exercise of consumer choice.

The transparency mode reflects this tension in the degree to which consumer-citizens are configured as able to engage critically with representations of the transparent corporation. In the public relations mode of framing, the citizenship dimension is emphasised by the performance of the division between scientific research and technological innovation. In this frame, corporations are responsible for developing biotechnology, which consumers then relate to through their economic decisions about GM products on the market. On the other side of this division, the regulation of GM foods is a matter for scientific advice to state regulatory agencies. Citizens can then engage in public debates that weigh up the emotional arguments for and against biotechnology based on the public scientific knowledge about the impacts of biotechnology. The following section goes on to explore the relationship of consumer-citizenship to corporate practices of innovation.

Staging the governance of corporate innovation

Each of the three modes of framing stages corporate innovation of biotechnology differently. In the following discussion I briefly describe how the governance of corporate biotechnology innovation is performed by the modes of framing. I then discuss the political implications of these differences before summing up my understanding of the potential role played by academic analysis in the political relations of corporate innovation.

The dialogue mode of framing performs corporate innovation of biotechnology as open to limited forms of public participation. Texts produced by DuPont, Monsanto and Unilever have all referred specifically to their intention to develop technologies 'in the public interest', and that are 'socially acceptable'. The three companies have

also established expert dialogue groups with the explicit intention of including 'public concerns' about biotechnology in their decision-making about biotechnology. In this regard, the dialogue mode of framing performs corporate technology policy as the object of public debate. As described in Chapter 4, this move has been interpreted in different ways within the companies. In one interpretation, public dialogue is a means to re-establish public *trust* in the corporation as the site at which technologies are developed in the interests of society, as well as in the interests of the companies' commercial success. In the second, more far-reaching interpretation, the companies' ability to develop new technologies depends on the public *legitimacy* of their technology decision-making through opening it up to public participation.

Like the dialogue mode, the transparency mode of framing performs corporate innovation of biotechnology an object of public debate. In this mode, however, the emphasis is on representing the process of corporate innovation to the company's consumer-citizens in order to render the company publicly accountable. The representations of corporate transparency discussed in Chapter 5 employ images of scientific rigour to demonstrate the care taken by the companies in developing GM crops. This use of science as a means of establishing corporate accountability points to an important tension in the way that the transparency mode of framing performs the governance of corporate innovation. This mode has been institutionalised as a means to achieve public trust in corporate technology policy through displays of the volume of corporate scientific research. Expressions of this mode have also emphasised the achievement of a more conditional public legitimacy through rendering corporate technology decision-making accountable to consumer-citizens with the capacity to judge the credibility of the claims made by the companies.

The public relations mode of framing corporate relations with 'the public' over GM foods does not produce corporate actions as the objects of public debate. Rather, this mode works to establish a distinction between corporate innovation strategy, which is judged by success in the market-place; and the safety and acceptability of the technology, which is decided by state regulation and public debate focusing on the attributes of the technology itself. The differences between performances of the governance of corporate innovation through the three modes of framing have

significant implications for the ways in which the political relations of biotechnology are configured.

The category of consumer-citizen is most directly configured through the dialogue and transparency modes of framing corporate innovation. However, the institutionalisation of these modes does not develop well articulated routes via which consumer-citizens can influence the actions of the corporation. The agency of consumer-citizens is assumed in these modes to lie in their ability to boycott particular products and to pressuring government regulatory decisions. Both forms of agency depend on the mobilisation of consumer-citizens, which is often achieved by campaigning NGOs. The legitimacy of the NGOs to speak for 'the public' is then open to question. The configuration of consumer-citizenship as operating globally is also problematic for the reason that it emphasises the citizen-like rights of consumers, which inevitably marginalises countries and groups of people who do not represent important markets for the companies. If the category of consumer-citizen develops further as an important political actor in corporate innovation, it is likely that it will do so in conjunction with existing political structures. For example, this could happen through changes in the state regulation of new biotechnology products which could require companies to demonstrate that they have included consideration of public concerns in their development of the product. Or, companies could be required to make fuller disclosure of their research activities as part of their annual reporting.

There is a strong distinction between the dialogue and transparency modes of framing and that of public relations. As this chapter has already rehearsed, this difference lies in the objects that are made visible to wider public debate. In the case of dialogue and transparency it is the corporate role in innovating biotechnology that is produced as open to public participation and transparent to public accountability. By contrast the public relations mode performs a distinction between the private, commercial decisions of the companies and the public role of the media and science as part of national regulatory arrangements for managing new technologies. The strength of the dialogue and transparency mode is that the importance of the particular site and circumstances of innovation are brought to light. Whereas the strength of the public relations mode is that it configures that technology itself as the object of public opinions. Clearly these three modes of framing have elements of inconsistency,

however this does not prevent them from operating in parallel, which is what this thesis has found.

Finally in this section I want to address my role as an academic social scientist in performing political innovation. I have argued that different performances of corporate engagements with public controversy have political consequences in terms of the actors configured and spaces produced. I have also argued that these performances have enrolled many different techniques and expertise. This thesis is itself a performance of the corporate engagements it describes, just as the other texts I have collected and produced stage corporate performances. Clearly then, this thesis is also a political intervention in the way that it draws attention to particular actors and processes.

As Mol and Mesman (1996) have written, the approach of showing how social and material orders are produced can be understood as a critical project, which operates by highlighting the possibility of different ways of ordering. As they argue: "the study of the co-existence of different orders shows how normativities clash and support one another in a given field" (Mol and Mesman, 1996: 433). The choices I have made in the research and writing of this thesis also reflect a political strategy of showing the interpretive flexibility of the way the world is ordered.

In this thesis I have chosen to examine the ambiguities of corporate engagements with controversy over biotechnology. As I have argued in this chapter, these performances of corporate relations with the public can be understood as both anti-political and political innovations. By emphasising the roles played by the category of consumer-citizens, I have sought to further open up possibilities that these corporate innovations will resonate with already established democratic political orders. By highlighting the spaces of negotiation in which these performances are staged I am following the project of O'Neill and Gibson-Graham (1999) in offering alternative sites at which political voice can be claimed with respect to the governance of corporate innovation.

7.6 Conclusions

This thesis contributes to scholarship in geography and science and technology studies on public controversy and the governance of biotechnology innovation. It does so in three ways. First, by contributing to the study of public controversies over GM foods in Europe and North America by focusing on corporations as a site at which public attitudes to biotechnology are framed. Second, by contributing to the development of a theoretical and empirical approach to studying corporations as actors in the governance of technological innovation. Third, by contributing to theorising the governance of technology, in particular the relations between corporations and the public in terms of a changing constitutional settlement between science and society.

Public controversy over GM foods is emblematic of the increasing complexity of problems confronting the governance of innovation. Social science research suggests that institutions such as regulatory agencies and innovative corporations should pay greater attention to societal concerns early in the innovation process in order to avoid costly public controversy in the later stages of innovation (Grove-White *et al.*, 2000). This thesis has explored how corporations have framed recent controversy over GM foods. In the course of carrying out research for this thesis I have adapted ethnographic techniques to focus on corporate engagements with consumer-citizens. This thesis finds that those corporations with significant commitments to agricultural biotechnology research have not developed radically different GM crops, instead they have innovated increasingly sophisticated engagements with public debates about biotechnology. The consequence of this move by innovative corporations is to contribute to an increasingly contentious politics of innovation.

This thesis contributes to recent scholarship which combines approaches in geography and science and technology studies. Aspects of science and technology studies have become familiar to geographers in the context of debates about nature, culture and materiality. In this thesis recent science and technology studies work on the governance of science and technology and the modes of production and circulation of public knowledge are introduced to geography. In a similar vein, geography's attention to the political economic processes implicated in global governance allow this thesis to place greater significance on the corporation as an institutional actor than

has been the case in most science and technology studies. This thesis therefore pays attention to the role of the corporation in the governance of innovation, both as a site of innovation and as an actor in the public sphere.

The argument running through this thesis contributes to a growing literature that seeks to understand contemporary science and society relations in terms of an emerging constitutional order. This approach focuses on the uses of the normative language of rights and duties to develop an analysis that spans social science concerns with technology and innovation. Research undertaken as part of this thesis suggests that categories of 'corporate social responsibility' and 'consumer-citizen' should be understood as the outcomes of discourses and techniques that are creating new objects for political contestation and new spheres of public debate.

The thesis is concerned throughout with the ways that social science research plays a part in the relations between technological innovation, the public sphere and corporations. In this way, it contributes to a reflexive understanding of the uses of social science in framing questions of technological innovation in the public sphere. Through an engagement with academic debates about the governance of biotechnology this thesis aims to contribute to practical political responses to the uncertainties of technological governance in a globalising world.

Appendix A: Abbreviations

ABC	Agricultural Biotechnology Council (Agbiotech industry public relations body, UK)
ABE	Agricultural Biotechnology in Europe (Agbiotech industry public relations body)
AEBC	Agricultural and Environmental Biotechnology Commission (UK Government advisory body)
agbiotech	agricultural biotechnology
BIO	Biotechnology Industry Organisation (Industry association, USA)
biotech	biotechnology
Bt	*Bacillus thuringiensis* (Bacterial insecticide)
BT	British Telecommunications plc
CEO	Chief Executive Officer
CBI	Council for Biotechnology Information (Agbiotech industry public relations body, North America)
DNA	deoxyribonucleic acid
EC	European Commission
EU	European Union
FDA	Food and Drug Administration, (US)
GM	genetically modified; genetic modification
GMO	genetically modified organism
NGO	non-governmental organisation
OECD	Organisation for Economic Cooperation and Development
OSTP	Office of Science and Technology Policy, (US President's)
PCR	polymerase chain reaction
SCIMAC	Supply Chain Initiative on Modified Crops, (UK)
STS	science and technology studies
UK	United Kingdom
US	United States (of America)
USA	United States of America
USDA	United States Department of Agriculture

Appendix B: Company Descriptions

Council for Biotechnology Information (CBI)

The CBI was launched in April 2000 by its founding members: Aventis CropScience, BASF, Dow, DuPont, Monsanto, Novartis and Zeneca Ag Products. The members' initial investment in the Council was $50 million a year for up to five years. The Council covers the USA, Canada and Mexico. It was set up and run by the public relations firm BSMG Worldwide and is located in Washington DC. In September 2000 Linda Thrane was appointed as CBI's Executive Director.

Sources: Holmes Report (2001), DuPont (2000c), Lambrecht (2000)

Agricultural Biotechnology Council (ABC)

The ABC was launched in February 2002 and covers the United Kingdom. Its founding members were Aventis CropScience, BASF, Dow, DuPont, Monsanto and Syngenta.
It is based in London but is part of a wider European body, Agricultural Biotechnology in Europe. ABC was initially run by Weber Shandwick, but in 2003 the £250,000 a year account was taken over by Lexington Communications.

Sources: ABC (2002), PR Week (2002)

Major Agricultural Biotechnology Companies

Section A: brief descriptions

AstraZeneca
AstraZeneca's agricultural interests were merged with those of Novartis to form Syngenta, announced in December 1999.

Aventis
Aventis announced in November 2000 that it would divest its agribusiness division, valued at $5.1 billion. The sale of this division to Bayer was finalised in June 2002.

BASF
BASF has continued its investment in agbiotech with an announcement in March 2000 of a $650 million investment plan.

Bayer
In June 2002 Bayer CropScience was formed from the merger of Bayer's agricultural interest with Aventis CropScience SA.

DuPont
See fuller description below.

Monsanto
See fuller description below.

Novartis
AstraZeneca's agricultural interests were merged with those of Novartis to form Syngenta, announced in December 1999.

Syngenta
Syngenta was formed by a merger of agricultural businesses of Novartis and AstraZeneca, which was floated on stock markets in November 2000.

Sources: Hall (2000)

Section B: fuller descriptions

DuPont

DuPont is a US based chemicals company which has dramatically increased its investment in biotechnology over the past decade. In 2002 it had sales of $24 billion and employed 79,000 people.

DuPont was founded just outside Wilmington, Delaware in 1802 as a manufacturer of explosives. Currently the majority of its products are advanced materials, textiles and coating. Its Agriculture and Nutrition Division includes DuPont's agrochemical, agbiotech, seeds, and food ingredients businesses.

1999 was a critical year for DuPont. It marked the cementing of DuPont's new commitment to biotechnology as the next technological platform that would enhance innovation and productivity across DuPont's businesses. Agricultural biotechnology was to be an important element in this strategy. In 1999 DuPont bought the remaining 80% of Pioneer Hi-bred International for $7.7 billion (Financial Times, 1999). Whereas DuPont's success throughout the twentieth century had been built on its ability to apply chemical research to new markets, DuPont wanted to mark its shift from the lower profit margins of the chemical industry to a 'high tech' biotechnology-based company. In 1999 DuPont changed the corporate slogan from "better things for better living, through chemistry" to "the miracles of science".

Sources: DuPont (2003)

Monsanto

Monsanto was founded in 1901 as a producer of saccharin. Other industrial chemicals followed, and in 1940 the company expanded into agricultural chemicals. The next defining shift came in 1985 when Monsanto bought the pharmaceutical company GD Searle. Between 1995 and 1998 Monsanto bought a large number of seed companies, including Holdens Foundation Seeds, DeKalb and Plant Breeding International. In

2000 Monsanto was bought by the pharmaceutical giant Pharmacia & Upjohn. Monsanto's pharmaceutical interests were absorbed into Pharmacia and the group's agricultural interests were then spun off, under the old Monsanto name in October 2000. Pharmacia then sold its remaining 84 per cent stake in Monsanto during August, 2002.

In the year ending 31 August 2003, Monsanto had sales of $4.9 billion and employed 13,000 people. In December 2002 Monsanto's chief executive had been forced to resign over the company's poor performance. The Annual report for 2003 tries to make the best of the previous year by noting that for the first time it earned more money from agbiotech products that its blockbuster all-purpose herbicide, Roundup: "gross profits from seeds and traits passed that of Roundup" (Monsanto, 2003: 2).

Monsanto has the largest share of the GM crops market. In 2003 over 90 per cent of the total area planted with GM crops were growing Monsanto traits (Monsanto, 2003b: 8). The company's brands include: Asgrow, DeKalb, Holdens, Cargill-Seeds International, Calgene, Monsoy, Agrecetus, Holden's Foundation Seeds Inc. and Plant Breeding International Cambridge Ltd.

Sources: Lheureus *et al.* (2003), Monsanto (2003b), Valkin (2002)

Unilever

Unilever is a large multinational consumer goods corporation with sales in 2002 of €49 billion, and 247,000 employees. The company's headquarters are in the Netherlands and the UK (Unilever, 2003). Unilever's business is divided into two main groups, 'home and personal care', which includes shampoos, soaps and detergents, and 'foods', which includes ice creams, margarine, and sauces. Since the early 1980s Unilever has invested in research into agribiotechnology, and in the early 1990s Unilever was involved in collaborating with ICI in the development of the GM tomato paste. Unilever pulled out of the research before the product was commercialised. However, it is as a producer of processed foods, using large quantities of soya in a wider range of products, that Unilever became most concerned with the potential problems of commercialising GM technology.

Appendix C: Example Interview Schedules

A: Example of typical interview schedule

Stephen Smith, ABC
Royal Society
3 Oct 2002
Interview Schedule

1). Explain my research
My interest in the abc
My research policy

2). Personal involvement:
How did you come to be chairman?
What are your main responsibilities?
Does this mean you have additional duties as a 'spokesman' for the crop biotechnology industry?

3). Context to establishment of the abc:
What was the situation before setting up of the abc? What was the problem?
What relation to situation in the US – the CBI?

4). What are the objectives of the abc?

5). How does it meet these objectives?

6). The brochure *New Choices* points to several future directions the abc will take. What is the current status of:

- Engaging stakeholders
- Taking account of wide range of concerns.
- Providing transparent information.

What role does the press play?

7). Some people argue that when engaging with the public it is important to adopt an "intuitive approach" rather than basing arguments on a scientific risk/benefit analysis.
What do you think?

8) Next steps
Who should I talk to?

B: Example of interview schedule for the Unilever NGO dialogue case:

Christine Drury, Unilever
Unilever House
7 Oct 2002
Interview Schedule

1). Explain my interest in NGO contact group – talk about my research methods, including use of alias and sharing transcripts.

2). Personal involvement:
How did you get involved? What did you do?

3). Context:
How was the problem diagnosed – did people agree what the problem was?
Were did the idea of an NGO dialogue group come from?
Did the work of the Contact Group change after 1996?

4). Solution:
What methods were put forward to solve this problem? What activities?
What was the role of 'more research'?
What role of 'public debate' why did Unilever want to support it?

5). In what different ways have insights that emerged from the Contact Group been institutionalised within Unilever?
- marketing research? new product development?

6). Conceptual Questions:
What is/should be the relationship between Unilever and i) social science, ii) NGOs, iii) wider publics?
What use are concepts of transparency and dialogue?

What is meant by 'public space' for Unilever and consumers to meet?

7). Next steps
Who should I speak to next?

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